

حمل الآن

مجاناً وحصرياً

المراجعة رقم (1)

اختبار شهر ابريل



1 [A] Complete the following statement:

1 Mark

The inclined plane is used to....., while the claw hammer is used to during removing a nail fixed in a wooden board.

[B] An effort of 100 N is exerted to lift an object weighing 400 N using a crowbar.

2 Marks

Calculate:

(1) The effort arm if the distance from the fulcrum to the position of the object is 0.2 m

*

(2) The mechanical advantage of the crowbar.

*

2 [A] Write the scientific term of the following statement:

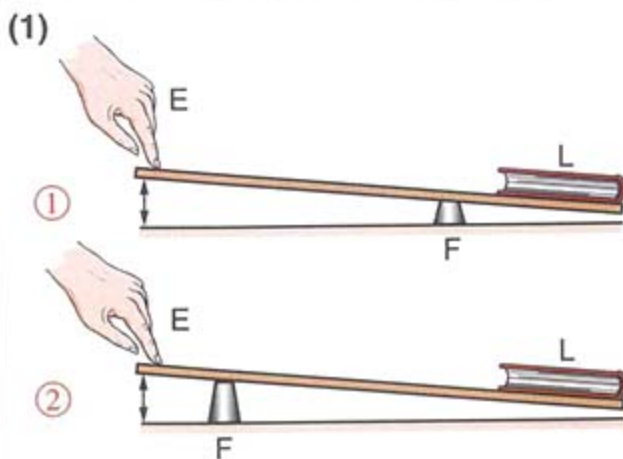
1 Mark

Moment of effort equals moment of load.

(.....)

[B] Study the following figures, then answer the questions below:

2 Marks



In which of the two figures, the applied effort is the least possible? Explain your answer.

*

(2)



Replace the numbers

①, ② and ③ with the elements of the lever, with mentioning its type.

*

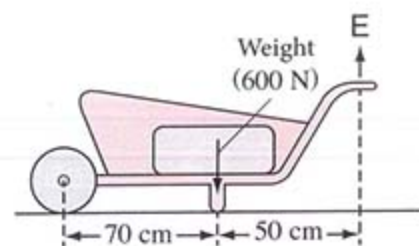
3 [A] Choose the correct answer:

1 Mark

From the opposite figure:

What is the effort (E) required to lift the wheelbarrow?

- (a) 350 N
- (b) 430 N
- (c) 600 N
- (d) 840 N



[B] Give reasons for the following:

3 Marks

(1) Second class levers always save effort.

*

(2) The human head represents a first class lever.

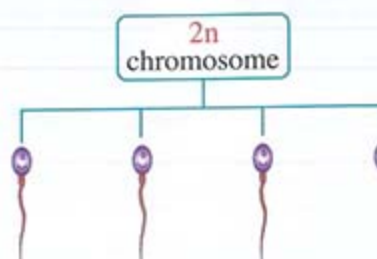
*

(3) Coal tongs usually do not save effort.

*

1 [A] Complete the following sentence :

The opposite figure represents a type of division called that occurs in the of the human male.



1 Mark

3 Marks

[B] Give reasons for the following:

(1) The potato plant and the chimpanzee animal are not similar although they have the same number of chromosomes in the somatic cells of each of them.

*

(2) Asexual reproduction does not cause appearance of new traits in the same species.

*

(3) Meiosis is called reductional division.

*

2 [A] Choose the correct answer :

If the number of chromosomes in a pollen grain of a flower is 7 chromosomes, then the number of chromosomes in one of its collenchymal cells equals

- (a) 7 chromosomes. (b) 14 chromosomes.
(c) 21 chromosomes. (d) 28 chromosomes.

1 Mark

2 Marks

[B] The opposite figure represents a vital phenomenon :

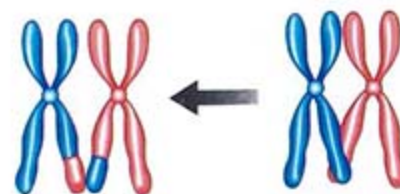
(1) What is the name of this phenomenon?

And what is the name of division in which it occurs?

*

(2) What is the importance of this phenomenon?

*



3 [A] Identify the odd item, then mention the connection between the others:

Intestinal cell / Ovary cell / Cardiac muscle cell / Ovum.

* /

1 Mark

[B] What happens when:

(1) Development of root which resulting from a bud in a potato tuber to absorb water and salts from the soil and the growth of stem and leaves towards the light.

*

(2) Fusion of a sperm of a male frog with an ovum of a female frog.

*

2 Marks

1 [A] Complete the following sentence:

1 Mark

The stamen consists of that ends with a swollen part called

[B] Mention one difference between each of the following:

3 Marks

(1) The calyx **and** the corolla.

*

(2) Tomato fruit **and** pomegranate fruit.

*

(3) Vegetative growth stage **and** seed dispersal stage in the life cycle of flowering plants.

*

2 [A] Mention the number of floral whorls in the flower of the eggplant. (.....)

1 Mark

[B] Give reasons for the following:

2 Marks

(1) Pollen grains in wind-pollinated flowers are smooth, while those in insect-pollinated flowers are rough.

*

(2) Naming simple umbel inflorescences as such.

*

3 [A] Choose the correct answer:

1 Mark

It is difficult to distinguish the colour of the sepals from the petals in the flowers of

(a) Egyptian rose.

(b) willow.

(c) petunia.

(d) daffodil.

[B] Study the following two figures, then answer:

2 Marks

(1)

What is the sex of this flower?

Give an example.

.....
.....



(2)

What is the name of the process represented by the diagram? **What** is the result of this process?

.....
.....



Exam Model ? ON UNIT 3

24 Marks

Question 1 6 Marks

A Complete the following sentences:

2 Marks

- (1) Sexual reproduction depends on division, while asexual reproduction depends on division.
- (2) Ovule turns into after completing the process.

B Mention one difference between each of the following:

4 Marks

- (1) Liver cell **and** ovum.
.....
- (2) First meiotic division **and** second meiotic division.
.....
- (3) Zucchini fruit **and** tomato fruit.
.....
- (4) Stamen **and** carpel.
.....

Question 2 6 Marks

A Choose the correct answer from the given options:

2 Marks

- (1) The flower symbolized by ♀ is
(a) typical flower. (b) a flower that does not contain a pistil.
(c) bisexual flower. (d) a flower that produces ovules.
- (2) Which of the following flowers is used to lower high blood pressure?
(a) Chamomile. (b) Lavender.
(c) Hibiscus. (d) Egyptian rose.

B (1) What is meant by each of the following:

2 Marks

1- The cell.
.....

2- The cancerous tumor.
.....

(2) From the adjacent figure:

1- What is the method of pollination in this flower?
.....

2- Why does this flower produce pollen grains in huge numbers?
.....



2 Marks

Question 3 6 Marks

A Use the following words to complete the sentences below:

2 Marks

less than , equals , greater than

- (1) The number of chromosomes in the ovule its number in the pollen grains.
- (2) The zygote contains a number of chromosomes its number in the human sperm.

B Mention the importance of each of the following:

4 Marks

(1) Mitosis.

.....

(2) Crossing-over phenomenon.

.....

(3) Stamen.

.....

(4) Receptacle.

.....

Question 4 6 Marks

A Put (✓) in front of the correct statement and (X) in front of the wrong ones:

2 Marks

- (1) Mitosis produces cells containing half the number of chromosomes of the parent cell. ()
- (2) All flowers that are cross-pollinated are unisexual. ()

B (1) Give reasons for the following:

2 Marks

1- Mitosis is called equational division.

.....

2- The peach fruit contains one seed, while the pea fruit contains many seeds.

.....

(2) From the two opposite figures:

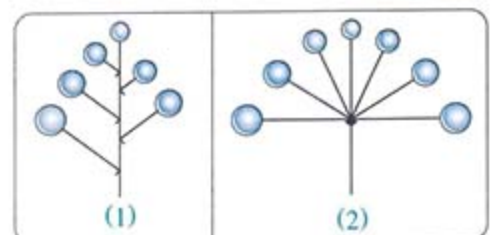
2 Marks

1- What does each of the two figures represent?

.....

2- Mention an example for each of them.

.....



1 [A] Write the scientific term that indicates the following statement:

1 Mark

The weight of a column of mercury 76 cm high acting on a unit area.

(.....)

[B] Mention one difference between:

3 Marks

(1) Weather and climate.

*

(2) Land breeze and sea breeze.

*

(3) Absolute humidity and relative humidity.

*

2 [A] Choose the correct answer:

1 Mark

Altitude above sea level leads to an

- (a) increase in atmospheric pressure.
- (b) increase in air density.
- (c) increase in the temperature.
- (d) expansion of air.

[B] If the minimum temperature in a certain city is 17°C and the daily temperature range is 15°C

2 Marks

Calculate each of the following:

(1) Maximum temperature for this day.

*

(2) Daily average temperature.

*

3 [A] Complete:

1 Mark

The Sun rays are perpendicular to the area of and their inclination increases as they approach

[B] What are the results of each of the following:

2 Marks

(1) Decreasing of atmospheric pressure relative to the length of the mercury column in the barometer and the height of the Torricelli's vacuum.

*

(2) Evaporation of moisture from the mucous membranes lining the respiratory tract.

*

1 [A] Complete the following sentence :

1 Mark

The decreasing of both the temperature and the humidity in leads to the formation of atmospheric pressure region.

[B] Give reasons for the following:

3 Marks

(1) No deflection of wind path at the Equator.

*

(2) Formation of clouds and rainfall over low-pressure system.

*

(3) The radiosonde is known as the radio probe.

*

2 [A] Mark (✓) or (X), with correction :

1 Mark

The wind deflects in the Northern Hemisphere in an anticlockwise direction.

()

[B] Mention the importance of each of the following :

2 Marks

(1) Weather forecasting in protecting lives and property.

*

(2) Weather buoys.

*

3 [A] Choose the correct answer :

1 Mark

Which of the following expresses the low-pressure system?

- (a) It is symbolized by the letter L in blue colour.
- (b) Ascending air currents are formed above it.
- (c) The atmospheric pressure decreases as you move away from its center.
- (d) The weather at it is sunny.

[B] The opposite figure is for one of the atmospheric pressure maps:

2 Marks

(1) What do the lines on the map represent?

*

(2) In which direction does the wind move?

*



Exam Model ? ON UNIT 4

24 Marks

Question 1 6 Marks

A Cross out the odd word, then mention the relation between the rest of words:

2 Marks

- (1) Temperature / Solar radiation / Wind / Latitude.
- (2) Temperature / Humidity / Vegetation cover / Altitude above sea level.

B (1) 1- **What is the name** of the latitude located at latitude 0° , **and is** the temperature there high **or** low? **With explanation.**

2 Marks

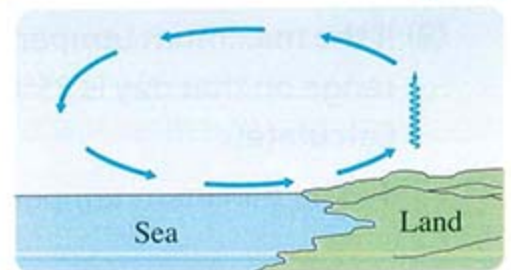
2- **Compare** between the latitudes 90°N and 60°S «In terms of: Atmospheric pressure».

(2) **The opposite figure represents one of the natural phenomena:**

2 Marks

1- **What** is the name of this phenomenon?
And when does it occur (daytime or night)?

2- **What** is the reason for this phenomenon?



Question 2 6 Marks

A Complete the following sentences:

2 Marks

- (1) The Egyptian lynx is an animal of the region, while the polar bear is an animal of the region.
- (2) Winds in the Northern Hemisphere move to the of their original direction due to

B **The radiosonde is one of the techniques used in weather forecasting:**

4 Marks

(1) **What** gas is used to fill this radiosonde? **With explanation.**

(2) **Why** does the radiosonde balloon explode at an altitude of 20 – 35 km above the Earth's surface?

(3) **What** is the reason for naming this probe as a radiosonde?

(4) **How** does the technique of weather buoys differ from the radiosonde?

Question 3 6 Marks**A Write the scientific term of each of the following statements:**

2 Marks

- (1) The prevailing state of the atmosphere in a specific location over a long period of time. (.....)
- (2) Storms which are loaded with sand and dust that blow over Egypt in the spring of every year. (.....)

B (1) The opposite figure shows a device used to measure one of the weather elements:

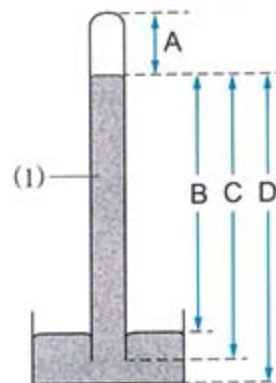
2 Marks

1- What is the name of this device?

And what is it used for?

2- Which letter shown on the figure indicates the value to be measured?

And what is the name of the substance (1)?



- (2) If the maximum temperature in one area is 42°C and the daily temperature range on that day is 25°C

2 Marks

Calculate:

1- The minimum temperature for that day.

2- Daily average temperature.

Question 4 6 Marks**A Choose the correct answer:**

2 Marks

- (1) When heating the air inside closed rooms
- (a) absolute humidity remains constant and relative humidity decreases.
- (b) relative humidity remains constant and absolute humidity decreases.
- (c) absolute humidity and relative humidity decrease.
- (d) absolute humidity and relative humidity increase.
- (2) Lines of equal atmospheric pressure on weather maps are known as
- (a) isotopes. (b) isobars. (c) isotones. (d) isomers.

B (1) Give reasons for the following:

2 Marks

1- Weather forecasts are probabilistic predictions and not absolute facts.

2- Stevenson screen is placed elevated above the ground surface.

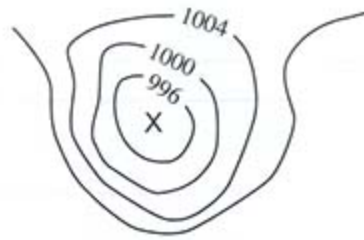
(2) Study the following two figures, then answer the questions below each:

2 Marks



1- What weather condition is represented by this icon?

.....



2- Is (X) represented by the letter H or L? **With explanation.**

.....

كيفية طباعة صفحات معينة من ملف معين

مثلا ازاي نطبع الصفحات من صفحة 4 الى صفحة 9



حمل الآن

مجاناً وحصرياً

المراجعة رقم (2)

اختبار شهر ابريل





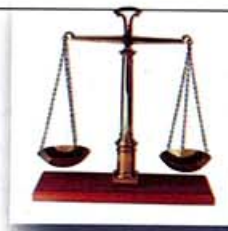
Lesson 2 : Levers



Classroom Performance

Patent for Invention

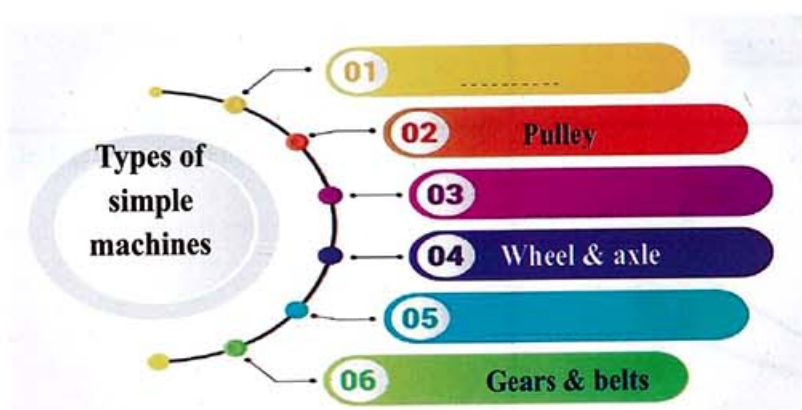
Since ancient times, man has been inventing machines that help him perform his heavy tasks easily. Take note of the following images and then get to know them using the internet.



What professions use the previous machines?

Simple Machine:

A tool that may have some moving parts and is used to make it easier to perform a task and reduce the exerted effort.



Complete the following table:

Machine	Type	Its importance
	.....	Change of force direction when lifting or lowering weights
	wedge	
		



	BBQ tongs	 Avoiding the risk of burning
	Hammer Claw	Lever
		 Transmission and speed change



Levers

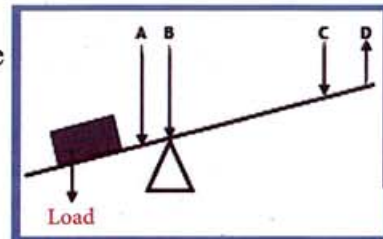
- Select on the following figures (Fulcrum - Effort - Load) and then mention the type of lever you belong to, explaining which one saves effort and which does not:

Figure	Type of lever	Figure	Type of lever
			
			
			
			

The Law of Levers

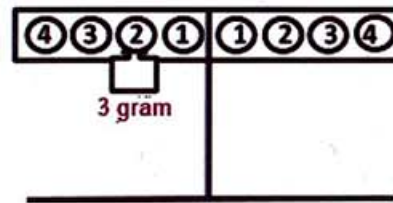
Study the problems in front of you and then answer:

Which figure of the following efforts (A-B-C-D) will raise the load more easily with the explanation



Choose the correct answer:

In order for the lever to be balance, a load of (2 g) is placed at a distance representing the number
(1 - 2 - 3 - 4)



Complete:

The following figures represents a lever from



..... type



..... type



..... type

You have a set of tools to choose from them that achieve the following levers:

Hockey bat

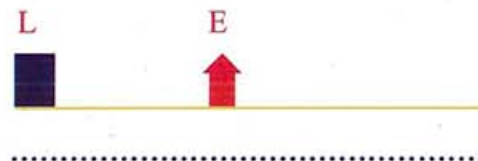
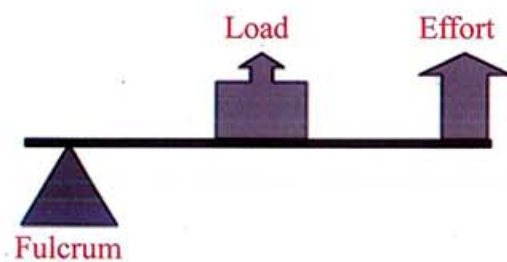
Garden cart

Lemon squeezers

Swing

Scissors

Candy Mask



Using the textbook and in the light of what you have studied, clarify what is meant by the following concepts:

Simple Machine	.....
Lever	.....
Fulcrum	.....
Effort arm	.....
Load arm	.....
The Law of Levers	.....
Moment of effort	.....
Moment of load	.....
Mechanical advantage of lever	.....



Homework Performances

Complete the following:

- 1-The effort arm is equal to the load arm in the levers
- 2-The most common type of levers are class levers.
- 3-If the effort exerted is half the value of the resistance and the load arm is 50 cm then the effort arm is equal to cm.

Correct the underlined words:

- 1-Soda water opener is a type first class lever .
- 2-One of the functions of the levers is to reduce the effort as in manual broom.
- 3-The first type of levers differ from the second type of levers in the presence of an effective effort.
- 4-The fishing rod is one of the second type of levers.

Mention the importance of each of the following:

- 1- lever :
- 2-Tweezers :
- 3- Crowbar :



Weekly Assessment

Write the scientific term:

- 1-A fixed point on which a rigid bar rests.
- 2-Levers where the fulcrum between effort and load .
- 3-Levers where the effort is between the load and the fulcrum point.
- 4-Levers where the load is between the effort and the fulcrum point.
- 5-The distance between the weight representing the load and the fulcrum point.

Complete the following statements:

- 1-Levers make tasks easier by , and
- 2-The crowbar is a class lever, while the manual broom is a class lever
- 3-The lever is in a state of equilibrium when the moment of the effort and the moment of load are

4-A machine saves effort when its mechanical advantage value is greater than

5-Increasing the length of the effort arm leads to

6-Second class levers are different from third class levers in

7-Examples of levers that increase speed

8-First class levers save effort when is longer than

What happens in the following cases

1 – The levers were not detected.

2- If the effort arm is longer than the load arm in the levers.

Give Reasons for the following:

1- Second class levers always save effort .

2 – Simple machines are very important in our lives.

3. The effort and load can be equal to the first type of levers only.

4- Third class levers do not always save effort.

5- Fixed pulley is a type of first-class lever.

Compare between:

The first, second and third class of levers in terms of: (definition – mentioning an example of each type – saving effort).

Problem:

1-A type of first class lever had a force of 40 N and a effort arm of 5 cm. It affected a load of 100 N.

Calculate the length of the load arm? Does the lever save effort or not?

2-Imagine trying to break a hard hazelnut shell and you have to choose between two similar crushers, one of which has a longer hand than the other.

Determine: What kind of levers is the nutcracker? And how does it work?

Which two crushers will you use?

Where do you put the hazelnut for the arms?

3-Imagine trying to lift a huge rock using a metal pole as a lever and a small stone as a fulcrum. (Explain your answer with a drawing).

1 - What type of levers will be used?

2 - Will you choose a long or short column to get the job done?

3 - Where will you put the small stone in relation to the huge rock?

4-A lever affected by a force of 30 N, its length 20 cm, and a load of 20 N and a load arm length of 10 cm.

1 – Is this lever balanced? and why?

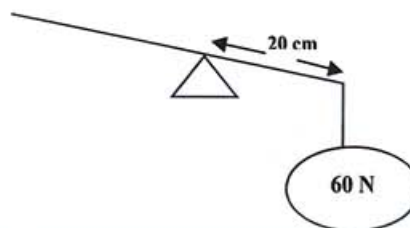
2 – If the lever is unbalanced, what is the length of the load arm that achieves balance?

5- Using the following table, **find the value of x, y** and state the law of levers.

Effort (Newton)	Effort Arm (cm)	Load (Newton)	Load Arm (cm)
X	5	1	10
4	5	2	Y

6 – **In the corresponding figure:**

On what dimension of the fulcrum does a load of 30 N is hanged, to balance the lever?





Lesson 1 : Cellular division



Classroom Performance

Origin of life

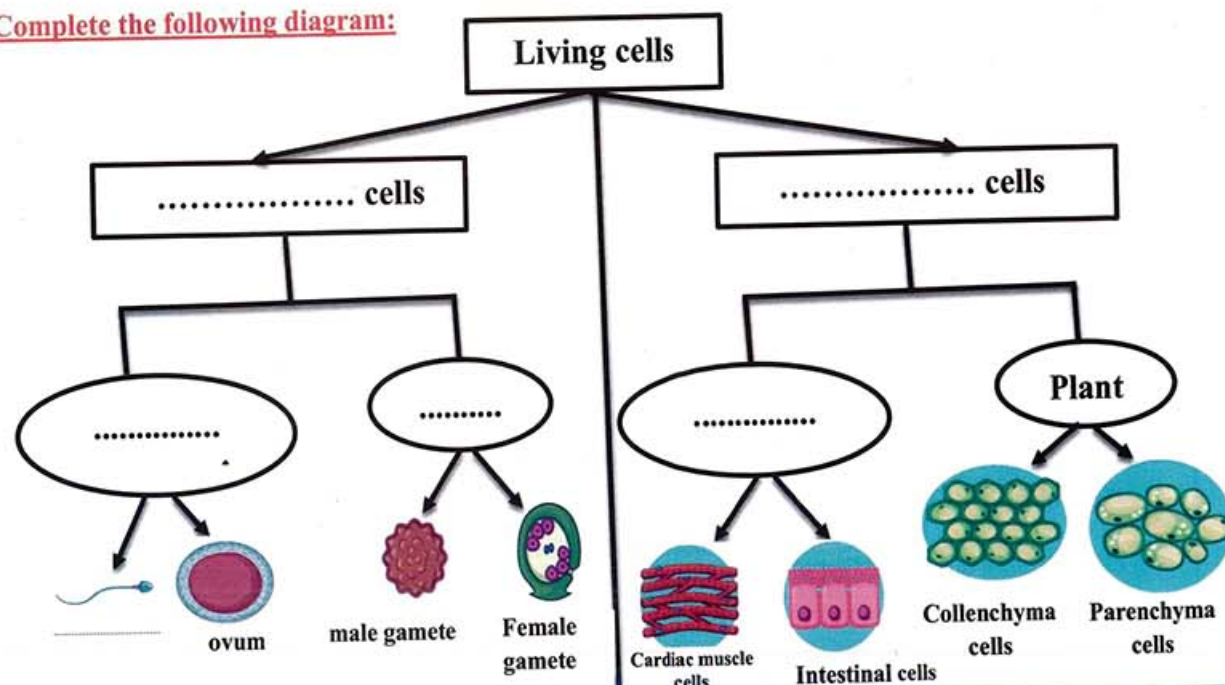
– Remember that there are two types of cells cell found in and cell found in

– Living organisms share in common characteristics such as nutrition, respiration, and and reproduction, and others.

Completed Table

Living organism	Number of chromosomes in			
	Somatic cell (2n)	Ovum (n)	Sperm (n)	Pollen grain (n)
Human	46	.....	.....	—
Gorilla	.....	.....	24	—
Pea plant	14	.....	—	.....
Wheat	.....	21	—	.....
Fruit fly	8	.....	.....	—

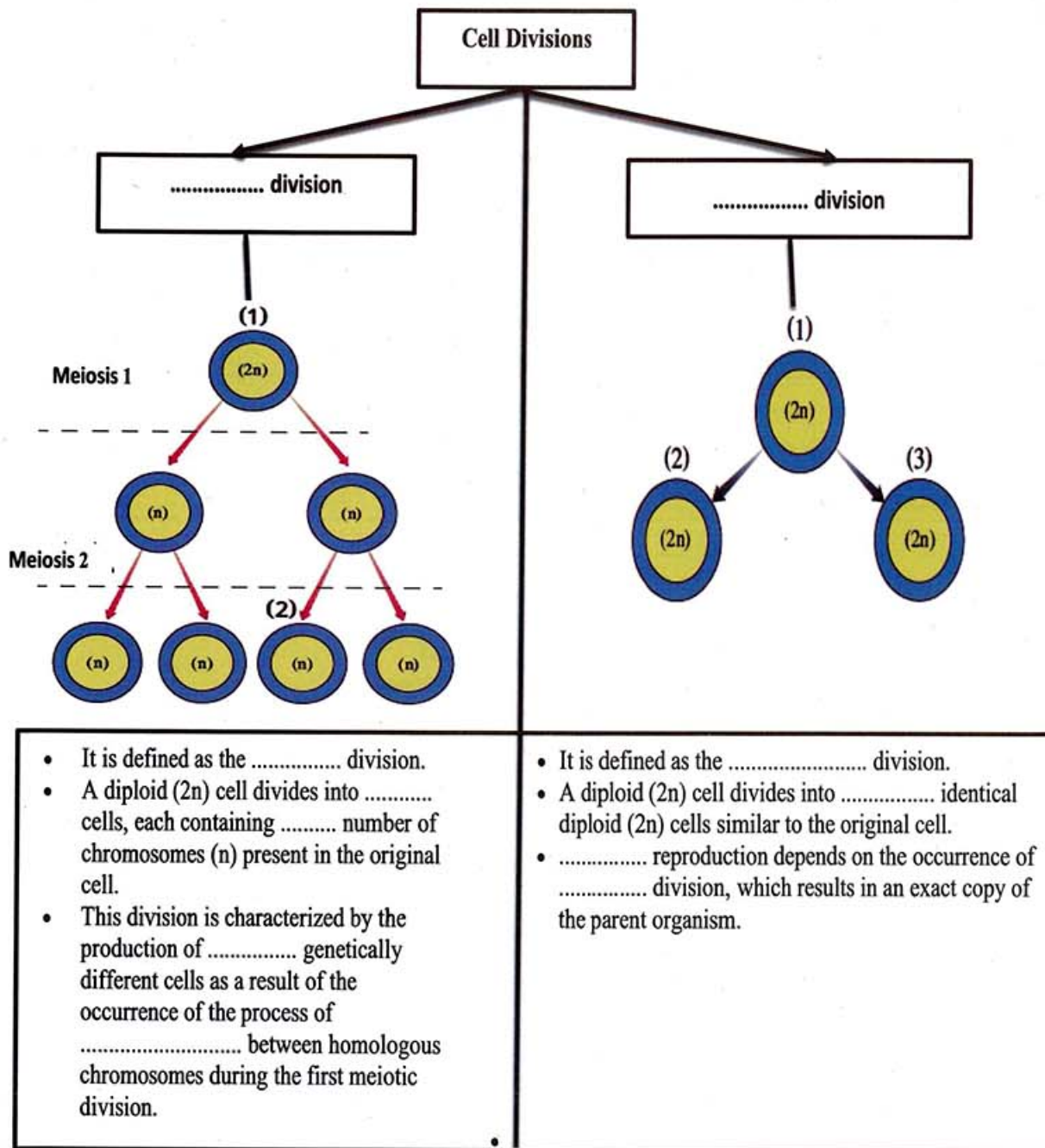
Complete the following diagram:



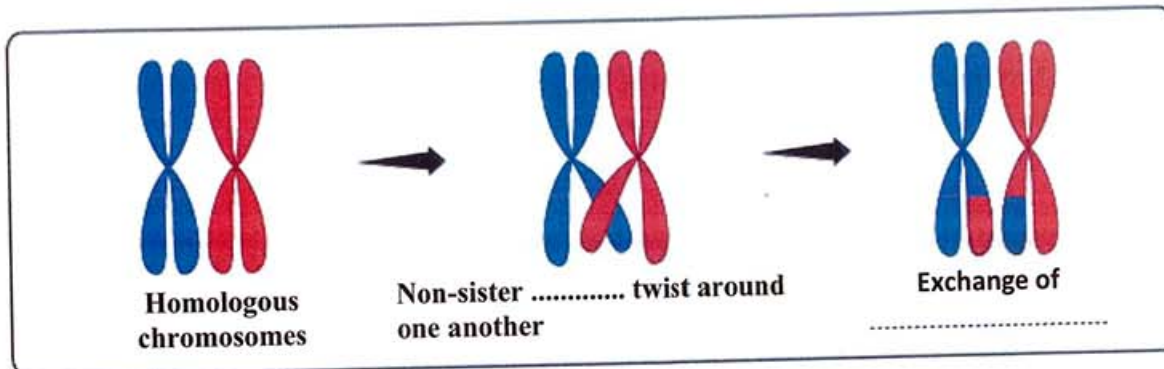
Gametes are produced by the gonads, and they are
Gametes contain number of chromosomes found in somatic cells, and they are symbolized by

- Somatic cells contain chromosomes arranged in homologous pairs, symbolized by
- The number of is constant in individuals of the same species of living organisms.

Complete the following diagram:



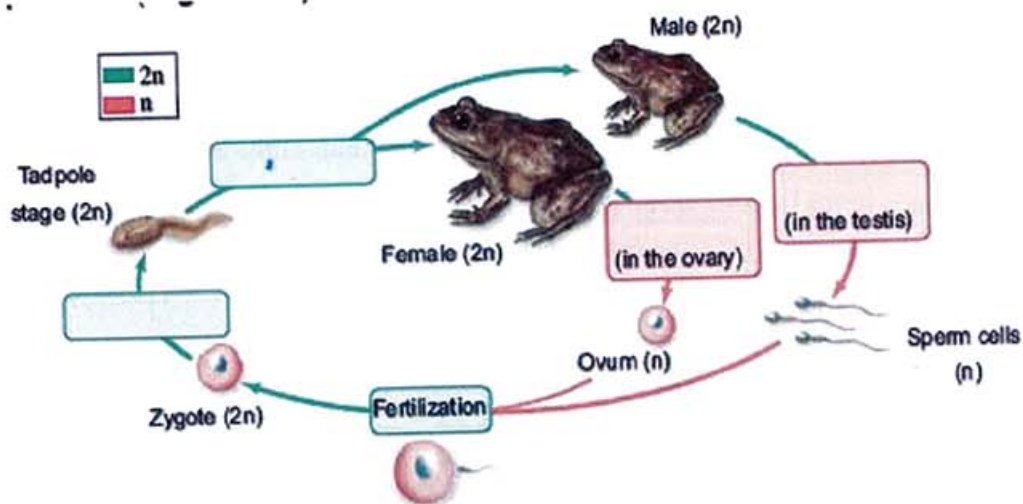
Look at the following figure, then complete the data:



..... Phenomena

Sexual reproduction:

Look at the following figure, then complete the data:



Sexual reproduction is defined as

Using the school textbook and in light of what you have studied, explain the meaning of the following

Somatic cells	.....
Asexual reproduction	.....
Reproductive cells	.....
Mitosis	.....
Meiosis	.....
Genetic crossing over	.....



Homework Performances

Write what is meant by the following statements:

- The basic unit of structure and function in living organisms.
- A vital process in which a living organism produces new individuals of the same species, ensuring its continuity and protection from extinction.

Correct the underlined statements:

- Vegetative reproduction is one of the forms of sexual reproduction.
- Gamete cells contain the full number of chromosomes found in somatic cells.

Give reasons for the following:

- Sexual reproduction leads to variation in the inherited characteristics of the resulting individuals.
- The equality of the number of chromosomes in the somatic cells of different living organisms does not mean genetic similarity.



Weekly Assessment

Write what is meant by the following statements:

- Specialized cells responsible for sexual reproduction in living organisms.
- Reproduction that occurs through two parent individuals of the same species, one male and the other female.
- The fusion of the nucleus of the male gamete (n) with the nucleus of the female gamete (n) to form a zygote that carries the full number of chromosomes (2n).

Correct the underlined statements:

- Mitosis is known as reduction division.
- Asexual reproduction depends on meiosis.
- The first meiotic division is a mitotic division.
- Vegetative reproduction leads to variation in the inherited characteristics of the resulting individuals.
- after the second meiotic division, two cells are produced containing half the original number of chromosomes (n).

Various questions:

- What is meant by a cancerous tumor?
- What is the importance of mitosis in humans?
- What is the importance of meiosis in humans?

Compare between:

- a) Somatic cells and reproductive (germ) cells.
- b) Sexual reproduction and asexual reproduction.

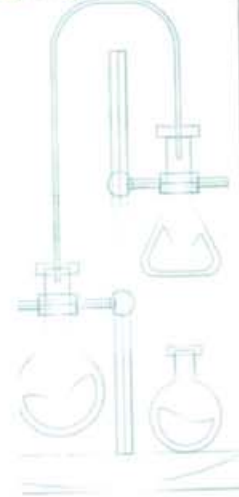
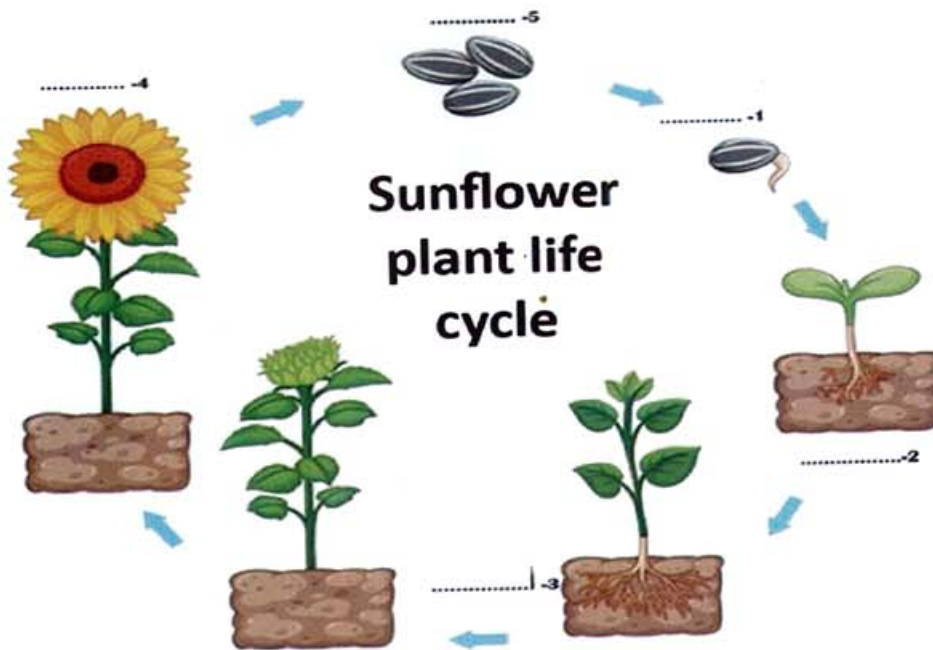


Lesson 2 : Floral Reproduction



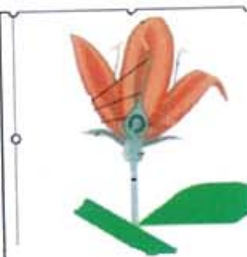
Classroom Performance

Sunflower plant



Origin of the Flower

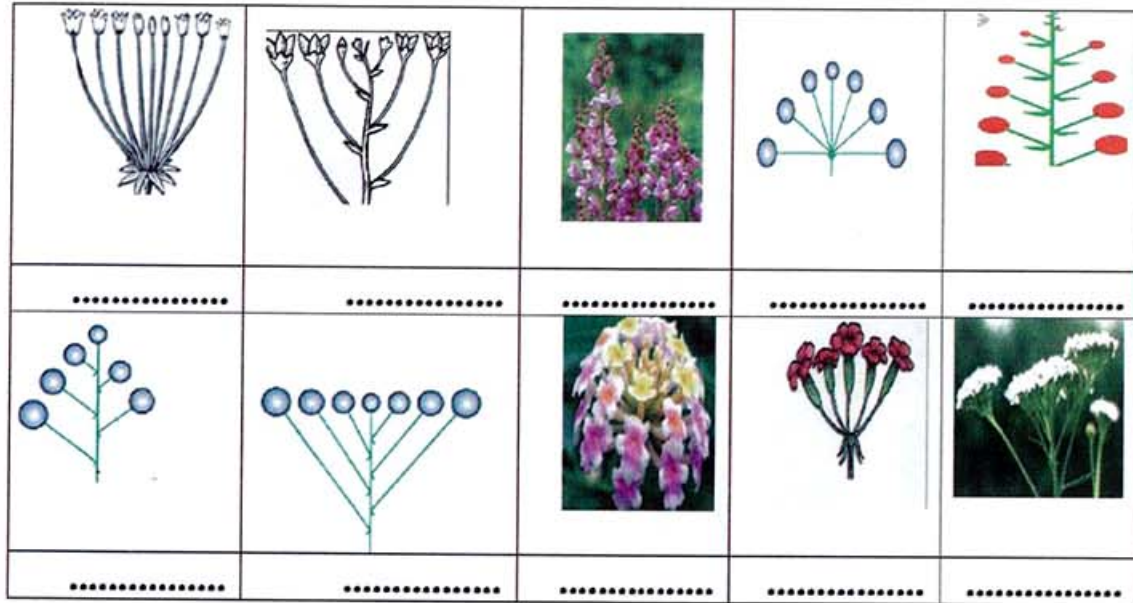
- Observe the following figures and identify the bract on them, then explain what is meant by a bract.



The bract is:

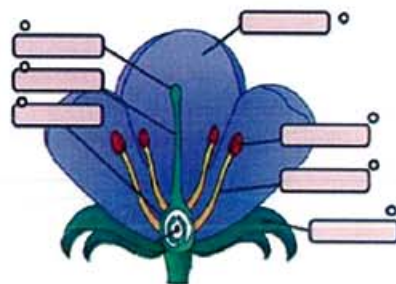
Types of Inflorescences

- Observe the following figures and classify the inflorescences into simple raceme inflorescences, simple corymb inflorescences, and simple umbel inflorescences, then mention examples for each type.



Structure of the Flower

Observe the adjacent figure, then identify the floral whorls on it and complete the labels on the diagram.



Based on your study of the structure of the typical flower, complete the following table:

Floral whorl	Name of the leaf forming it	Main function
Calyx		
Corolla		
Androecium		
Gynoecium		

Study the figures in front of you, then identify the name of the plant and state the difference between them in terms of (petals and sepals).



(2)



(1)

Name of the plant	Sepals	Petals

Observe the following flowers, then determine the sex of each flower and explain the reason:



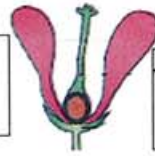
The flower:

.....



The flower:

.....



The flower:

.....

Pollination and Fertilization in Flowers

Based on your study of the types of pollination, determine the type of pollination in each of the following cases:

1. The androecium and gynoecium mature at the same time. (.....)
2. The anthers are far from the stigmas or are at a higher level than them. (.....)
3. All flowers are unisexual. (.....)
4. Flowers remain closed and do not bloom until pollination. (.....)

Means of Pollen Grain Transfer

Compare between insect pollination and wind pollination using the following table:

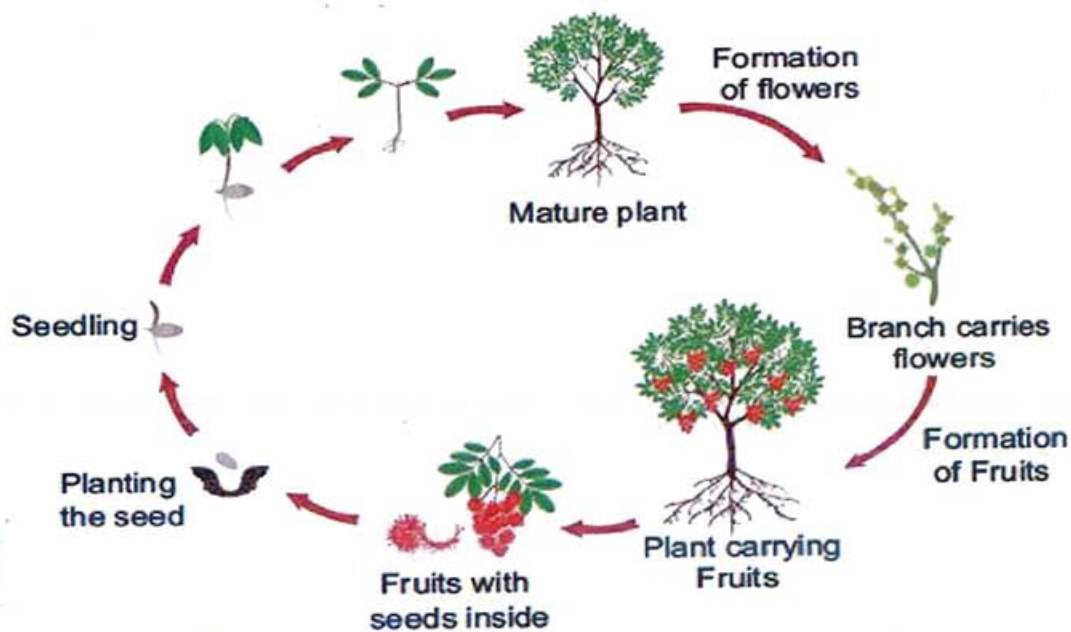
Aspect of comparison	Insect pollination	Wind pollination
Color of petals		
Size of petals		
Scent and nectar		
Anthers		
Pollen grains		
Stigmas		

Fertilization

Determine the steps of fertilization and fruit formation:



Observe the following figure of the life cycle of flowering plants, then identify its four main stages:



Using the school book and in the light of what you have studied, explain the meaning of the following terms:

Flower	.....
Typical flower	.....
Floral envelope	.....
Androecium	.....
Gynoecium	.....
Bisexual flower	.....
Unisexual flower	.....
Pollination	.....
Fertilization	.....



Homework Performances

1- Complete the following:

- After fertilization, the ovary matures and becomes a while the ovules change into
- The floral whorl that protects the internal parts of the flower before its blooming is the
- Examples of unisexual flowers include the plant and the plant

2- Write the scientific term indicated by the following statement:

- The male reproductive organ in the flower, consisting of several stamens.
(.....)

3- Compare between self-pollination and cross-pollination
(in terms of definition and how each occurs)



Weekly Assessment

State the scientific reason for each of the following:

1. Petals in many flowers are brightly colored and have a Fragrant scent
2. Anthers hang outside the flowers of some plants that are pollinated by wind.
3. Pollen grains in insect-pollinated plants are sticky or rough.
4. The importance of the floral envelope in flowers such as the *Narcissus* flower.
5. Wind-pollinated plants produce pollen grains in very large numbers.

What happens if:

1. Anthers and stigmas do not mature at the same time?
2. A pollen grain falls on the stigma of a flower of a different species?
3. The gynoecium is removed from a typical flower before it blooms?

Write the scientific term indicated by the following statements:

1. The transfer of pollen grains from the anthers of a flower to the stigmas of another flower on a different plant of the same species.
2. A short stem whose leaves are modified to carry out reproduction in the plant.
3. A cell formed by the fusion of the egg nucleus, containing (2N) chromosomes.

Compare between:

- Pollen grains in wind-pollinated flowers and pollen grains in insect-pollinated flowers.
- Bisexual flowers and unisexual flowers.
- Androecium and gynoecium in terms of structure and function.

Choose the odd word out, then state the relationship between the remaining ones:

- Zucchini – Date palm – Tomato – Maize
- Stigma – Style – Ovary – Filament



Week

(11)

Lesson 1: The Effect of Temperature and Pressure on Climate Change

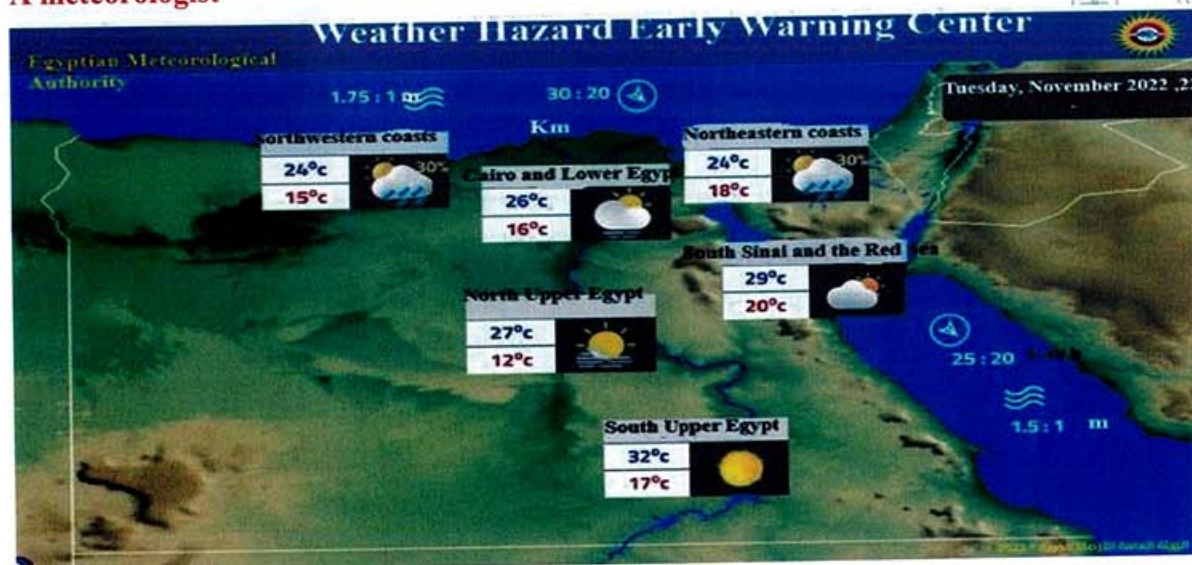
Date

.../.../...



Classroom Performance

A meteorologist



- The Previous image is from the Egyptian meteorological authority
- Imagine yourself as a meteorologist asked to identify the weather elements in previous image
- Weather elements.....

Study the adjacent picture carefully, then answer the following:

The picture represents a weather station that contains many instruments used to determine the weather:

- What are the names of these instruments?
- What is the function of each one?

Record your answers in the following table:



	Instrument Name	Function or Use
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

- Follow the weather forecast for two weeks during the summer season, and also track the temperature throughout the entire summer season. Then determine the weather and the climate

(You may use the Weather Website website as ema.gov.eg)

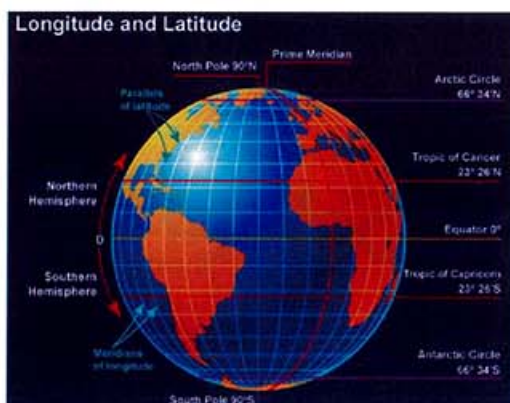


- Based on your observation of the weather and climate, identify the elements of weather and the elements of climate.

- Based on your previous studies, complete the following table:

An animal that lives in a high-temperature environment	A plant that lives in a high-temperature environment.
An animal that lives in a low-temperature environment.	A plant that lives in a low-temperature environment.

- Study the figure in front of you and identify the different thermal zones on the diagram, and explain the reason for their variation.

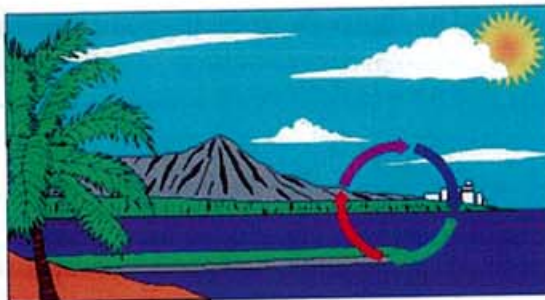


The reason for their variation:

- Based on your study of the world map, identify one country located in each thermal zone.

Country name	Thermal zone

Physical Changes in the Atmosphere



.....

.....

- The previous pictures represent
Write the name of the phenomenon under each picture.

Explain how this phenomenon occurs.....

- Some of your friends went to the Saint Catherine Mountains on a climbing trip. Give a number of important instructions to ensure your friends' safety.



- Based on your previous analysis of the weather forecast, choose one day and determine:

Daily average temperature	Daily temperature range
.....	

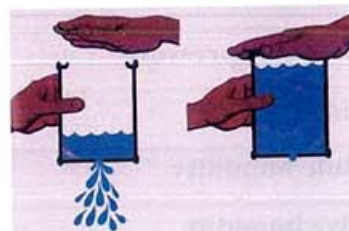
- Why did the scale reading differ in the two cases?



- We conclude from that that:

- Why does the water not fall in the case (1)?

- Why did the water fall in the case (2)?

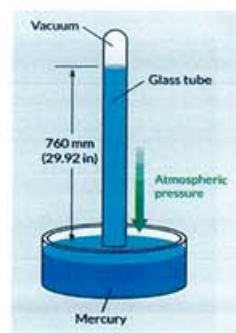
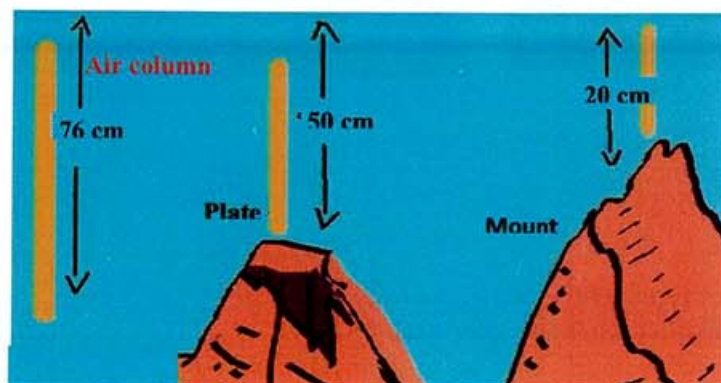


(2)

(1)

- We conclude from that that:

- The figure in front of you is used to measure
which is defined as
- Its unit of measurement is
.....



From the previous figure

- Which has higher atmospheric pressure: the mountain surface or the plateau surface? Explain your answer.
.....
- State the factors that affect atmospheric pressure and explain the relationship between them.
.....
- using the textbook and in light of what you have studied, explain the meaning of the following terms

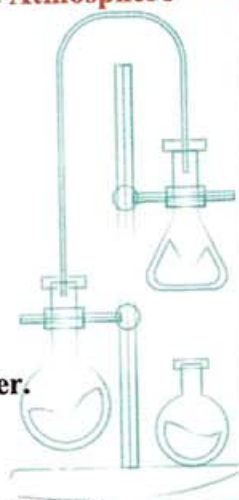
Weather	.....
Climate	.....
Maximum temperature	.....
Minimum temperature	.....
Daily average temperature	.....
Daily temperature range	.....
Atmospheric pressure	.....
Humidity	.....
Absolute humidity	.....
Relative humidity	.....



Homework Performances

State the scientific reason for:

1. The variety of weather and climate elements.
2. The existence of different thermal zones on the Earth's surface.
3. The occurrence of sea breeze.
4. The difference in the daily temperature range from one city to another.
5. The variation of atmospheric pressure from one region to another.
6. The effect of humidity on atmospheric pressure.
7. The decrease in temperature with increasing distance away from the Equator.



What happens if:

1. Increase both of the maximum and minimum temperatures?
2. We move higher above sea level?
3. The specific heat of water differs from that of land at night?

Compare between:

1. Weather and Climate.



Weekly Assessment

State the scientific reason for:

1. Temperature is considered the most important climatic element.
2. Areas close to the Equator are characterized by high temperatures.
3. The occurrence of land breeze.
4. Temperature decreases as we rise above sea level.
5. The daily average temperature differs from one city to another.
6. Atmospheric pressure decreases with increasing altitude above sea level.
7. Temperature affects atmospheric pressure.
8. Temperature is affected by differences in lines of latitude.
9. Temperature is affected near water bodies.
10. The rate of influenza spread increases in winter.

What happens if:

1. We move closer to or farther away from the Equator?
2. Humidity increases (with respect to pressure)?
3. Temperature increases (with respect to pressure)?



Compare between:

1. Daily average temperature and daily temperature range.
2. Land breeze and sea breeze.

Write the scientific term for:

1. The state of the atmosphere at a specific place over a short period of time.
2. The prevailing state of the atmosphere at a specific place over a long period of time.
3. The highest temperature in one day.
4. The lowest temperature in one day.
5. The weight of a column of air with a cross-sectional area of 1 m^2 and a height equal to the height of the atmosphere.
6. The amount of water vapor present in the air.
7. The actual mass of water vapor present in a given volume of atmospheric air.



The Second Monthly Assessment

Q1: Write the scientific term indicated by the following statements:

1. A fixed point on which a rigid rod rests.
2. Levers in which the fulcrum lies between the effort and the load.
3. Levers in which the effort lies between the load and the fulcrum.
4. Levers in which the load lies between the effort and the fulcrum.
5. The distance between the load (resistance) and the fulcrum.
6. Specialized cells responsible for sexual reproduction in living organisms.
7. Reproduction that occurs by two parent individuals of the same species, one male and the other female.
8. The fusion of the nucleus of the male gamete (n) with the nucleus of the female gamete (n) to form a zygote carrying the full number of chromosomes ($2n$).
9. The unit of structure and function in living organisms.
10. A vital process in which a living organism produces new individuals of the same species, ensuring its continuity and protection from extinction.
11. The male reproductive organ in the flower, consisting of several stamens.
12. The transfer of pollen grains from the anthers of one flower to the stigmas of another flower on a different plant of the same species.
13. A short stem whose leaves are modified to carry out reproduction in plants.
14. A cell formed by the fusion of the egg nucleus with the pollen nucleus and containing ($2n$) chromosomes.

Q2: Complete the following statements:

1. Levers make tasks easier by , , and
2. The crowbar is a lever of the class, while the hand broom is a lever of the class.
3. A lever is in equilibrium when the moment of the effort the moment of the load.
4. A machine saves effort when its mechanical advantage is greater than
5. Increasing the length of the effort arm leads to
6. Second-class levers differ from third-class levers in the
7. Examples of levers that increase speed are
8. First-class levers save effort when the is greater than the
9. The effort arm equals the load arm in levers.
10. The most common type of levers is the class.
11. If the applied effort is half the load value and the load arm is 50 cm, then the effort arm equals cm.
12. After fertilization, the ovary develops into a while the ovules develop into
13. The floral whorl that protects the inner parts of the flower before blooming is the
14. Examples of unisexual flowers are the plant and the plant.



Q3: Correct the underlined words:

1. A bottle opener is a first-class lever.
2. One function of levers is decreasing force as in the hand broom.
3. First-class levers differ from second-class levers in the presence of an applied force.
4. A fishing rod is a second-class lever.
5. Vegetative reproduction is a form of sexual reproduction.
6. Gamete cells contain the full number of chromosomes found in somatic cells.
7. Mitosis is known as reduction division.
8. Asexual reproduction depends on meiosis.
9. The first meiotic division is a mitotic division.
10. Vegetative reproduction leads to genetic variation in the resulting individuals.
11. In the second meiotic division, two cells are produced, each having half the original chromosome number (n).

Q4: Give reasons for the following:

1. Second-class levers save effort.
2. Simple machines are of great importance in our lives.
3. Effort and load can be equal only in first-class levers.
4. Third-class levers do not always save effort.
5. A fixed pulley is considered a first-class lever.
6. Sexual reproduction leads to genetic variation among offspring.
7. The equality of chromosome numbers in somatic cells of different organisms does not mean they are genetically identical.
8. Petals in many flowers are brightly colored and fragrant. .
9. Anthers hang outside the flowers of some wind-pollinated plants.
10. Pollen grains in insect-pollinated plants are sticky or rough.
11. The importance of the floral envelope in Narcissus flowers.
12. Wind-pollinated plants produce pollen grains in very large numbers.



**Q5: What happens in the following cases?**

1. Levers were not discovered.
.....
2. The effort arm is longer than the load arm in levers.
.....
3. Anthers and stigmas do not mature at the same time.
.....
4. A pollen grain falls on the stigma of a flower of another species.
.....
5. The gynoecium is removed from a complete flower before it opens.
.....

Q6: Compare between:

1. First-, second-, and third-class levers in terms of:
(definition – example – saving effort)
2. Somatic cells and gonads.
3. Sexual reproduction and Asexual reproduction.
4. Pollen grains in wind-pollinated flowers and pollen grains in insect-pollinated flowers.
5. Bisexual flowers and unisexual flowers.
6. Androecium and gynoecium in terms of structure and function.
7. Self-pollination and cross-pollination (definition and method).

Q7: Mention the importance of each of the following:

1. Lever:
2. Forceps:
3. Crowbar:
4. Mitosis in humans:
5. Meiosis in humans:

Q8: Problems:

1. A first-class lever has an applied effort of 40 N and an effort arm of 5 cm. It acts on a load of 100 N.
 - Calculate the length of the load arm.
 - Does the lever save effort or not?
2. A lever is acted upon by an effort of 30 N with an effort arm of 20 cm, and a load of 20 N with a load arm of 10 cm.
 - Is the lever in equilibrium? Why?
 - If the lever is not in equilibrium, what should be the length of the load arm to achieve equilibrium



صفحة الفيس تعالوا



Lesson 2 : Levers



Classroom Performance

نتعلم صح مع مس عيسى

Since ancient times, man has been inventing machines that help him perform his heavy tasks easily. Take note of the following images and then get to know them using the internet.

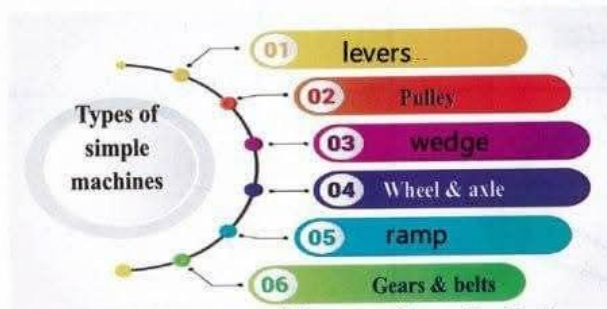
levers - simple machines	Archimedes' screw	Shadoof
Saqia	wheel and axle	Water wheel = saqia
pliers	scissors	tweezers
crowbar	hockey bat	balance
What professions use the previous machines?		

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on YouTube

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on YouTube

Simple Machine:

A tool that may have some moving parts and is used to make it easier to perform a task and reduce the exerted effort.



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Complete the following table:

Machine	Type	Its importance
	<u>pully</u>	Change of force direction when lifting or lowering weights
	wedge	change direction of force Abeer Samir Science on YouTube
	<u>ramp</u> inclined plane	save effort

صفحة الفيس تعالوا

نتعلم صح مع مس عبير



	BBQ tongs	 lever	Avoiding the risk of burning
	Hammer Claw	Lever	 increase force
		gears and belt	Transmission and speed change Abeer Samir Science on YouTube

صفحة الفيس تعالوا
نتعلم صح مع مس عبير

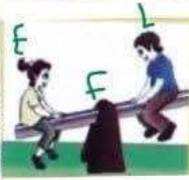
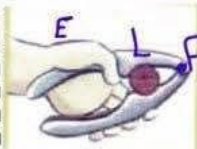


صفحة الفيس تعالوا

Forces and Motion

نتعلم صح مع مس عير

- Select on the following figures (Fulcrum - Effort - Load) and then state the type of lever you belong to, explaining which one saves effort and which does not:

Figure	Type of lever	Figure	Type of lever
	first..... save.....		second..... save.....
	first..... save.....		first..... doesn't save
	first..... doesn't save		second..... save.....
	second..... save.....		third..... doesn't save

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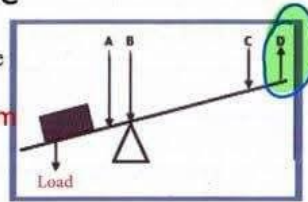
The Law of Levers

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Study the problems in front of you and then answer:

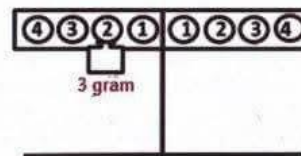
Which figure of the following efforts (A-B-C-D) will raise the load more easily with the explanation

bec. when effort arm is longer than load arm effort will be smaller than resistance



Choose the correct answer:

In order for the lever to be balance, a load of (2 g) is placed at a distance representing the number3...
(1 - 2 - 3 - 4)



Complete:

The following figures represents a lever from

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.....1..... type



.....3..... type



.....2..... type

You have a set of tools to choose from them that achieve the following levers:

third

Hockey bat

second

Garden cart

second

Lemon squeezers

first

Swing

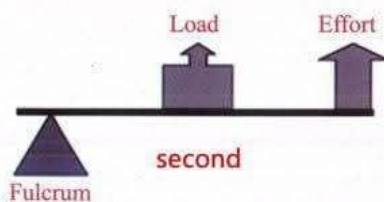
first

Scissors

third

third

Candy Mask



صفحة الفيس تعالوا

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Forces and Motion

Using the textbook and in the light of what you have studied, clarify what is meant by the following concepts:

Simple Machine	tool used by man to save effort or time or both in performing tasks
Lever	rigid bar (straight or curved) rotates around fixed point (fulcrum) and affected by effort force and resistance force
Fulcrum	fixed point (pivot) where levers rotate around
Effort arm	distance between effort force and fulcrum
Load arm	distance between load and fulcrum
The Law of Levers	... effort force $\times$ its arm = load $\times$ its arm
Moment of effort	product of effort and its arm
Moment of load	product of load and its arm
Mechanical advantage of lever	... load / effort ... or ... effort arm / load arm



Homework Performances

Complete the following:

- 1-The effort arm is equal to the load arm in the first class levers
- 2-The most common type of levers are first class levers.
- 3-If the effort exerted is half the value of the resistance and the load arm is 50 cm then the effort arm is equal to 100 cm.

Correct the underlined words:

- 1-Soda water opener is a type first class lever . second
- 2-One of the functions of the levers is to reduce the effort as in manual broom. transmit
- 3-The first type of levers differ from the second type of levers in the presence of an effective effort. fulcrum
- 4-The fishing rod is one of the second type of levers. third

Mention the importance of each of the following:

- 1-lever : increase force- increase speed - avoid danger - save time and effort
- 2-Tweezers : accuracy
- 3-Crowbar : save effort- use small force to move heavy load



Weekly Assessment

Write the scientific term:

- 1-A fixed point on which a rigid bar rests. fulcrum
- 2-Levers where the fulcrum between effort and load . first class levers
- 3-Levers where the effort is between the load and the fulcrum point. third
- 4-Levers where the load is between the effort and the fulcrum point. second
- 5-The distance between the weight representing the load and the fulcrum point. load arm - resistance arm

Complete the following statements:

- 1-Levers make tasks easier by save time-effort and increase force - increase speed
- 2-The crowbar is a first class lever, while the manual broom is a third class lever
- 3-The lever is in a state of equilibrium when the moment of the effort and the moment of load are equal.....

Second Preparatory

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4-A machine saves effort when its mechanical advantage value is greater than **one**

5-Increasing the length of the effort arm leads to **save effort** (force is smaller than load

6-Second class levers are different from third class levers in **presence of load in the middle** -save effort

7-Examples of levers that increase speed **hockey bat - tennis racket**

8-First class levers save effort when **effort arm** longer than **load arm**

What happens in the following cases

1 - The levers were not detected. **can't make tasks easier**

2 - If the effort arm is longer than the load arm in the levers. **lever saves effort**

Give Reasons for the following:

1 - Second class levers always save effort . **1- bec, effort arm is longer then resistance arm**

2 - Simple machines are very important in our lives. **2- to save time -effort in performing tasks**

3. The effort and load can be equal to the first type of levers only. **3- bec sometimes effort arm equals load arm**

4 - Third class levers do not always save effort. **4- bec effort arm is shorter than load arm**

5- Fixed pulley is a type of first-class lever. **5- bec fulcrum is in the middle between effort force and load**

Compare between:

The first, second and third class of levers in terms of: (definition - mentioning an example of each type - saving effort).

first - levers that have F in the middle between E and L -seesaw - doesn't save effort

second - levers that have L in the middle between E and F - wheel barrow - save effort

third - levers that have E in the middle between F and L - manual broom - doesn't save effort

Problem:

1-A type of first class lever had a force of 40 N and a effort arm of 5 cm. It

affected a load of 100 N. **Effort force x its arm = resistance force x its arm= 40x5=100 x its arm = 40x5/100 = 2 cm**

Calculate the length of the load arm? Does the lever save effort or not? **save effort**

2-Imagine trying to break a hard hazelnut shell and you have to choose

between two similar crushers, one of which has a longer hand than the other.

Determine: What kind of levers is the nutcracker? And how does it work? **second class lever - increase force**

Which two crushers will you use? **longer hand**

Where do you put the hazelnut for the arms? **away between effort force and fulcrum**

3-Imagine trying to lift a huge rock using a metal pole as a lever and a small stone as a fulcrum. (Explain your answer with a drawing).

1 - What type of levers will be used? **first - crowbar**

2 - Will you choose a long or short column to get the job done? **long**

3 - Where will you put the small stone in relation to the huge rock? **in middle near from load**

4-A lever affected by a force of 30 N, its length 20 cm, and a load of 20 N and a load arm length of 10 cm.

effort x its arm = 30x20=600 --- load x its arm = 20x10=200

1 - Is this lever balanced? and why? **unbalanced bec moment of force isn't equal moment of load**

2 - If the lever is unbalanced, what is the length of the load arm that achieves balance?

5- Using the following table, **find the value of x, y and state the law of levers.** **effort x its arm / load = 30x20/20=30 cm**

Effort (Newton)	Effort Arm (cm)	Load (Newton)	Load Arm (cm)
X	5	1	10 1x10 / 5 = 2 N
4	5	2	Y 4x5/2=10 cm

6- **the corresponding figure:**

On the following diagram, the fulcrum is in the middle. A load of 60 N is hanged, to balance the lever?

effort x its arm = load x its arm

$$20 \times 60 / 30 = 40 \text{ cm}$$

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صفحة الفيس تعالوا

Unit three

Reproduction in Living Organisms

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Classroom Performance

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Origin of life

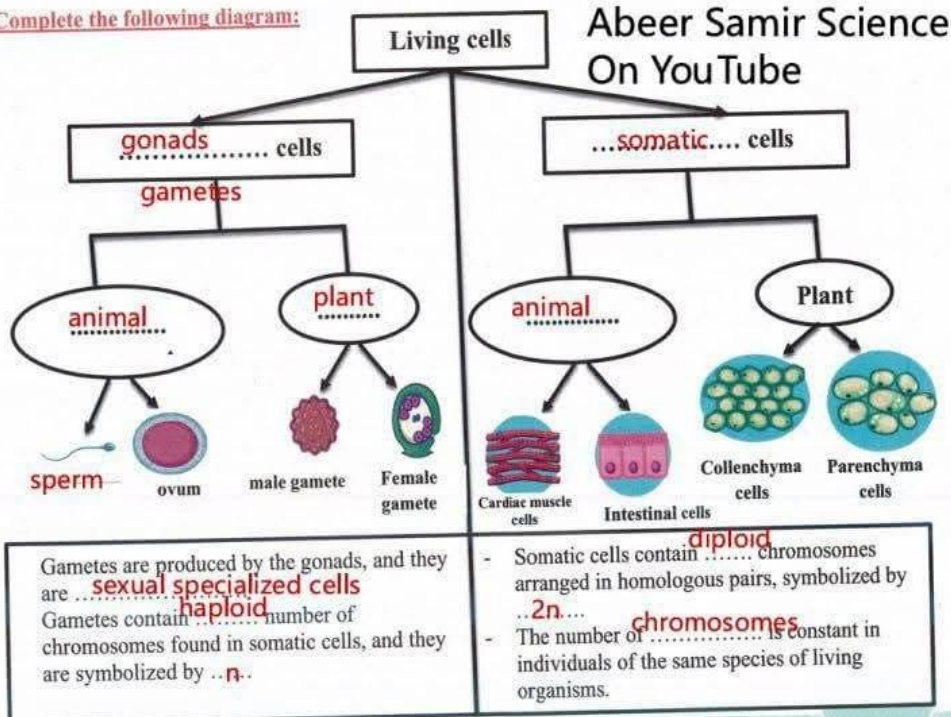
Remember that there are two types of cells cell found in and
reproductive cell found ingonads.....

Living organisms share in common characteristics such as nutrition, respiration, ..sensation and and reproduction, and others.
movement

Completed Table

Living organism	Number of chromosomes in			
	Somatic cell (2n)	Ovum (n)	Sperm (n)	Pollen grain (n)
Human	46	...23...	23.....	—
Gorilla	...48...	...24...	24	—
Pea plant	14	...7.....	—	...7.....
Wheat	...42.....	21	—	...21.....
Fruit fly	8	...4.....	...4.....	—

Complete the following diagram:



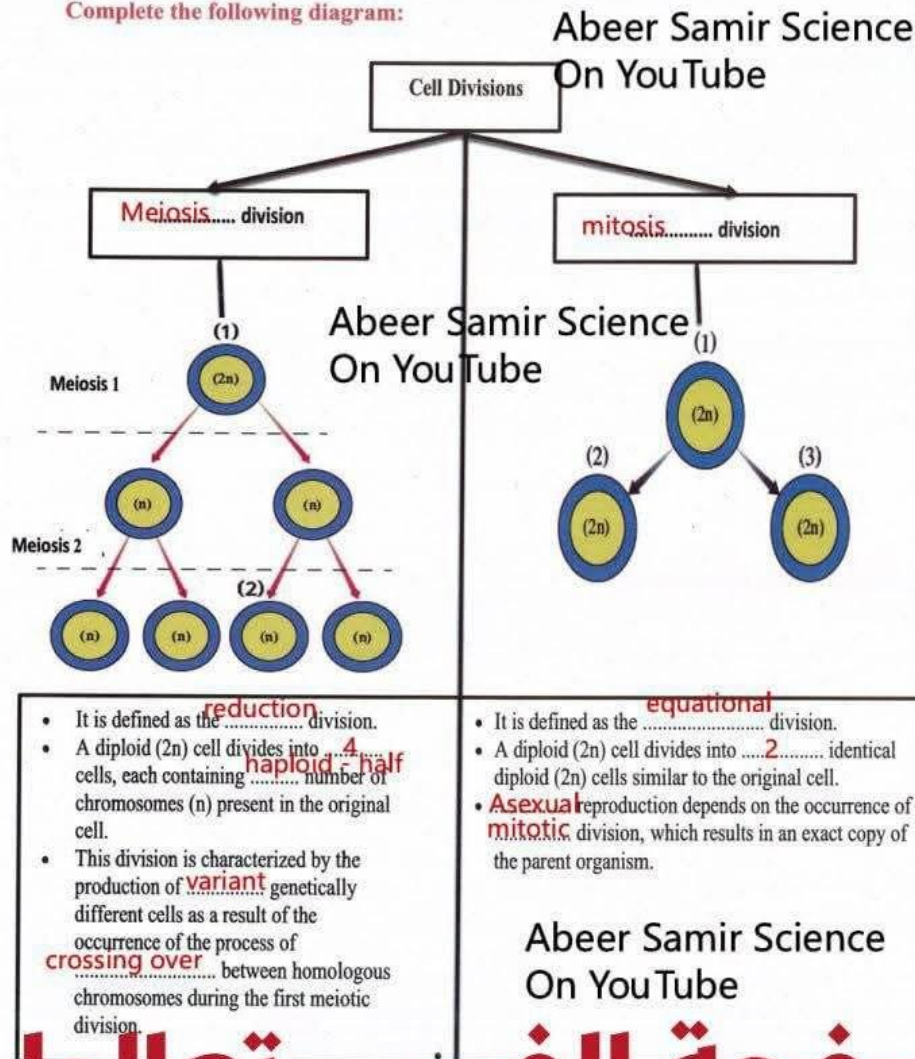
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Complete the following diagram:



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صفحة الفيس تعالوا

Reproduction in Living Organisms

نتعلم صح مع مس عبير

Look at the following figure, then complete the data:

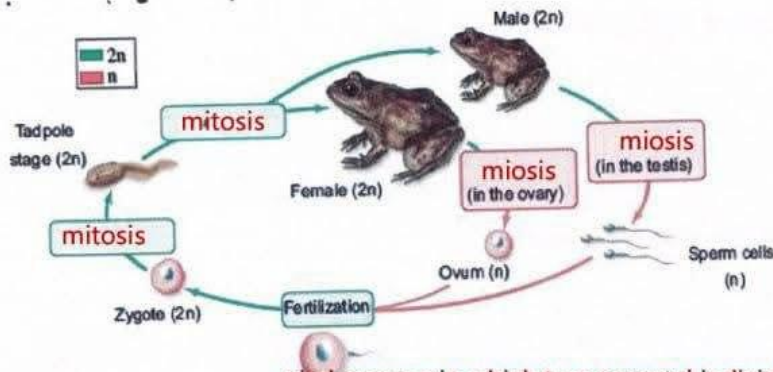


crossing over Phenomena

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Sexual reproduction:

Look at the following figure, then complete the data:



vital process in which two parental individuals of same species one is male and one is female participate to produce new individuals carry combination of genetic traits of both parents

Sexual reproduction is defined as

Using the school textbook and in light of what you have studied, explain the meaning of the following

Somatic cells	All cells of living organisms except reproductive cells
Asexual reproduction	vital process in which parental individuals produces new individuals completely identical in genetic traits
Reproductive cells	specialized cells responsible for sexual reproduction in living organisms
Mitosis	type of cell division occurs in somatic cells which each diploid somatic cell $2n$ divides into two identical cells $2n$
Meiosis	type of division occurs in gonad cells which each diploid cell $2n$ divides into 4 haploid cells
Genetic crossing over	

A phenomenon occurs in meiosis 1 where exchange in genetic materials leads to diversity of genetic traits

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Second Preparatory

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Homework Performances

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Write what is meant by the following statements:

- The basic unit of structure and function in living organisms. **cell**
- A vital process in which a living organism produces new individuals of the same species, ensuring its continuity and protection from extinction. **reproduction**

Correct the underlined statements:

- Vegetative reproduction is one of the forms of sexual reproduction. **Asexual**
- Gamete cells contain the full number of chromosomes found in somatic cells. **half**

Give reasons for the following:

- Sexual reproduction leads to variation in the inherited characteristics of the resulting individuals. **Due to crossing over phenomenon in meiosis 1 during gametes formation where genetic traits exchange**
- The equality of the number of chromosomes in the somatic cells of different living organisms does not mean genetic similarity. **bec different species carry different genetic traits**



Weekly Assessment

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Write what is meant by the following statements:

- Specialized cells responsible for sexual reproduction in living organisms. **gametes**
- Reproduction that occurs through two parent individuals of the same species, one male and the other female. **sexual**
- The fusion of the nucleus of the male gamete (n) with the nucleus of the female gamete (n) to form a zygote that carries the full number of chromosomes (2n). **fertilization**

Correct the underlined statements:

- Mitosis is known as reduction division. **equational**
- Asexual reproduction depends on meiosis. **mitosis**
- The first meiotic division is a mitotic division. **second**
- Vegetative reproduction leads to variation in the inherited characteristics of the resulting individuals. **sexual**
- after the second meiotic division, two cells are produced containing half the original number of chromosomes (n). **4**

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Various questions: **abnormal and repeated cell growth formed when somatic cell undergoes uncontrolled mitotic division**

- What is meant by a cancerous tumor? **body growth -healing wounds - repair damage tissues**
- What is the importance of mitosis in humans? **production gametes in gonads - reduce chromosomes number to half in gametes to ensure restoring original number of chromosomes of the species after mating so chromosomes count remains constant**
- What is the importance of meiosis in humans?

Compare between:

- Somatic cells and reproductive (germ) cells.
- Sexual reproduction and asexual reproduction.

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صفحة الفيس تعالوا

Second term

نتعلم صح مع مس عبير

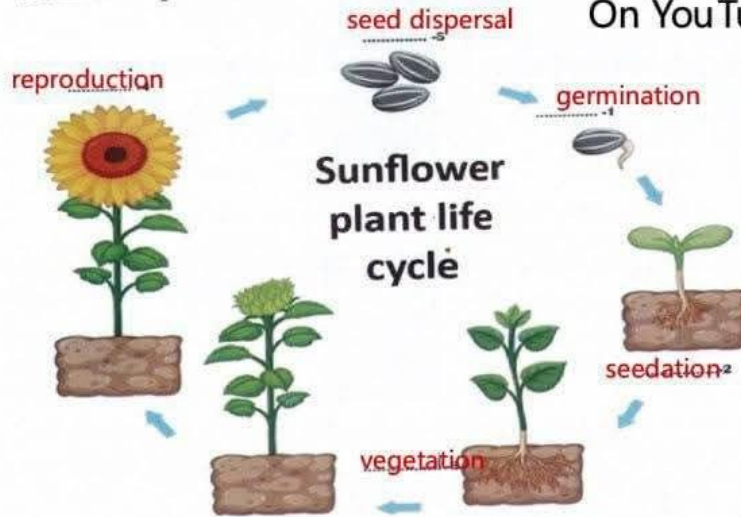
صفحة الفيس تعالوا

Reproduction in Living Organisms

نتعلم صح مع مس عبير

Sunflower plant

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Origin of the Flower

- Observe the following figures and identify the bract on them, then explain what is meant by a bract.



The bract is: leaf which vegetative bud emerges from its axil and develop into flower

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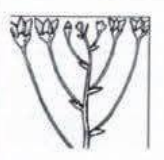
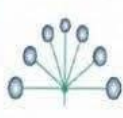
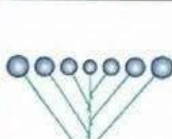
Second Preparatory

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Types of Inflorescences

- Observe the following figures and classify the inflorescences into simple raceme inflorescences, simple corymb inflorescences, and simple umbel inflorescences, then mention examples for each type.

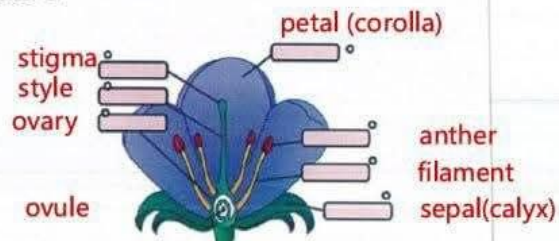
				
umbel.....	corymb.....	raceme	umbel...	raceme
				
raceme.....	corymb.....	umbel...	umbel.....	corymb

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Structure of the Flower

Observe the adjacent figure, then identify the floral whorls on it and complete the labels on the diagram.

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صفحة الفيس تعالوا

نتعلم صح مع مس عبير

صفحة الفيس تعالوا

Reproduction in Living Organisms

نتعلم صح مع مس عبير

Floral whorl	Name of the leaf forming it	Main function
Calyx	sepal	protect inner parts especially before blooming
Corolla	petal	protect productive organs and attract insect
Androecium	stamen	produce pollen grains
Gynoecium	carpel - pistil	produce ovules

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Study the figures in front of you, then identify the name of the plant and state the difference between them in terms of (petals and sepals).



(2)



(1)

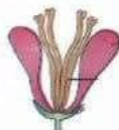
Name of the plant	Sepals	Petals
Egyptian rose	separate	separate
petunia	fused	fused

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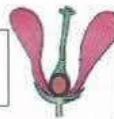
Observe the following flowers, then determine the sex of each flower and explain the reason:



The flower:
bisexual



The flower:
..male



The flower:
..female

Pollination and Fertilization in Flowers

Based on your study of the types of pollination, determine the type of pollination in each of the following cases:

1. The androecium and gynoecium mature at the same time. (...self pollination...)
2. The anthers are far from the stigmas or are at a higher level than them. (...cross pollination.....)
3. All flowers are unisexual. (...cross pollination.....)
4. Flowers remain closed and do not bloom until pollination. (...self pollination...)

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Second Preparatory

صفحة الفيس تعالوا

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نتعلم صح مع مس عير

Means of Pollen Grain Transfer

Compare between insect pollination and wind pollination using the following table:

Aspect of comparison	Insect pollination	Wind pollination
Color of petals	bright colourful	dull
Size of petals	large	small
Scent and nectar	scented	scentless
Anthers	inside flower	hanged outside flower
Pollen grains	sticky - rough	light - dry - smooth
Stigmas	sticky	sticky - feathry

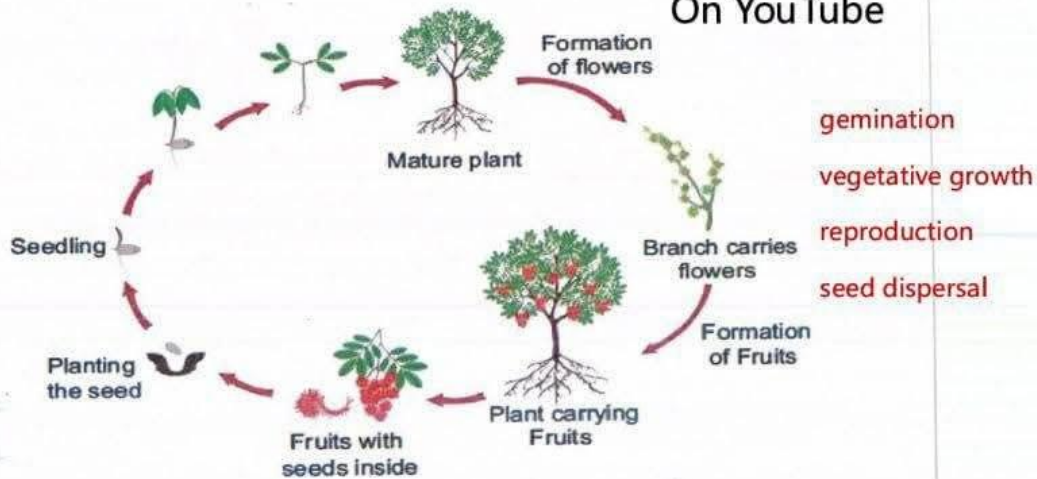
Fertilization

Determine the steps of fertilization and fruit formation:



Observe the following figure of the life cycle of flowering plants, then identify its four main stages:

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صفحة الفيس تعالوا

Reproduction in Living Organisms

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Using the school book and in the light of what you have studied explain the meaning of the following terms:

نتعلم صح مع مس عيبر

Flower	reproductive organ in plant - stem whose leaves modified into flower
Typical flower	flower that has 4 floral whorls - contains both male - female organs
Floral envelope	...calyx and corolla together
Androecium	male organ in the flower
Gynoecium	female organ in the flower
Bisexual flower	flower that has 4 floral whorls - contains both male - female organs
Unisexual flower	flower that has 3 floral whorls - contains male or female organ only
Pollination	transfer of pollen grain from anther to stigma
Fertilization	fusion of male cell nucleus and female cell nucleus to form zygote



Homework Performances

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1- Complete the following:

- After fertilization, the ovary matures and becomes a ..**fruit**..... while the ovules change into ..**seeds**.....
- The floral whorl that protects the internal parts of the flower before its blooming is the ..**calyx**.....
- Examples of unisexual flowers include the plant **palm** and the plant **corn**

2- Write the scientific term indicated by the following statement:

- The male reproductive organ in the flower, consisting of several stamens. (**Androecium**.....)

3- Compare between self-pollination and cross-pollination (in terms of definition and how each occurs)

self: process of transfer of pollen grains from anther of flower to stigma of another flower in same plant

cross:

process of transfer of pollen grains from anther of flower in a plant to stigma of another flower in another plant of same species

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1-to attract insects to help in pollination

2-to facilitate their opening by wind

3-to stick with insect body

4- protect reproductive organs in flower - attract insect to help in pollination

5- to compensate what lost in air

Discover and Learn



Weekly Assessment

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State the scientific reason for each of the following:

1. Petals in many flowers are brightly colored and have a Fragrant scent
2. Anthers hang outside the flowers of some plants that are pollinated by wind.
3. Pollen grains in insect-pollinated plants are sticky or rough.
4. The importance of the floral envelope in flowers such as the *Narcissus* flower.
5. Wind-pollinated plants produce pollen grains in very large numbers.

What happens if: 1& 3- cross pollination occurs - 2- fertilization won't occur

1. Anthers and stigmas do not mature at the same time?
2. A pollen grain falls on the stigma of a flower of a different species?
3. The gynoecium is removed from a typical flower before it blooms?

Write the scientific term indicated by the following statements:

1. The transfer of pollen grains from the anthers of a flower to the stigmas of another flower on a different plant of the same species. **cross polination**
2. A short stem whose leaves are modified to carry out reproduction in the plant. **flower**
3. A cell formed by the fusion of the egg nucleus, containing (2N) chromosomes. **zygote**

Compare between:

- Pollen grains in wind-pollinated flowers and pollen grains in insect-pollinated flowers. **dry - smooth - light (wind) ---- (insect) rough or sticky**
contains 4 floral whorls (both male and female organ - unisexual contains 3 floral whorl male or female only)
- Bisexual flowers and unisexual flowers.
- Androecium and gynoecium in terms of structure and function.
stamen (produce pollen grain) carpel (produce ovule)

Choose the odd word out, then state the relationship between the remaining ones:

- Zucchini – Date palm – **Tomato** – Maize **unisexual**
- Stigma – Style – Ovary – **Filament** **carpel structure (female organ in flower)**

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صفحة الفيس تعالوا

نتعلم صح مع مس عبير

صفحة الفيس تعالوا

Unit Four

Physical Changes in the Atmosphere

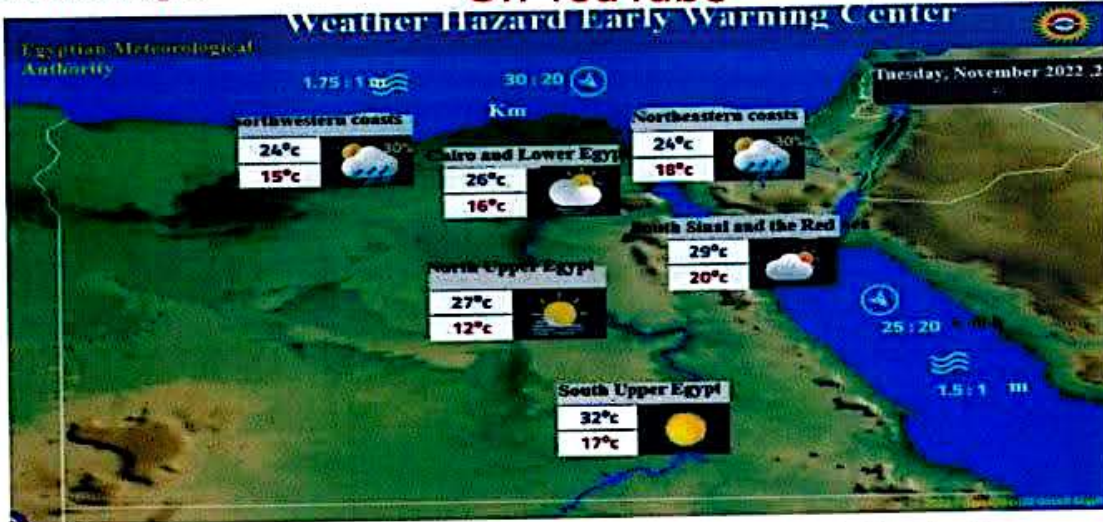
نتعلم صح مع مس عبر

Classroom Performance

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A meteorologist

On YouTube



- The Previous image is from the Egyptian meteorological authority
- Imagine yourself as a meteorologist asked to identify the weather elements in previous image
- Weather elements.....temperature - solar radiation - wind - atmospheric pressure - humidity - precipitation - condensation

Study the adjacent picture carefully, then answer the following:
The picture represents a weather station that contains many instruments used to determine the weather:

- What are the names of these instruments?
- What is the function of each one?

Record your answers in the following table:



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	Instrument Name	Function or Use
1	Thermometer	measure temperature
2	barometer	atmospheric pressure
3	Anemometer	wind speed
4	rain guage	amount of rain
5	weather radar	track thunder storm and hurricane - speed of rain
6	Hygrometer	humidity
7	satallite	image weather elements
8	meteroscope	predict weather in upper layer
9		
10		

Second Preparatory

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صفحة الفيس تعالوا

Unit 4

Discover and Learn

نتعلم صح مع مس عير

weather: atmospheric conditions over certain area for short period of time

climate: atmospheric conditions for long period of time

- Based on your observation of the weather and climate, identify the elements of weather and the elements of climate.

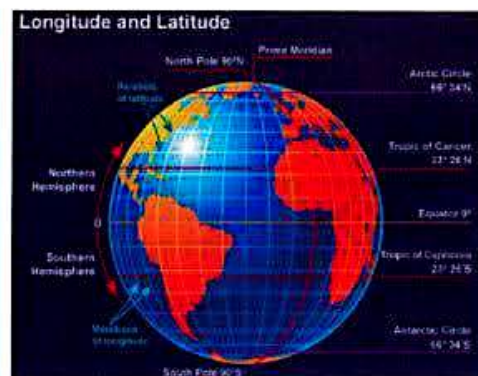
temperature - solar radiation - wind - atmospheric pressure - humidity - precipitation - condensation

- Based on your previous studies, complete the following table:

An animal that lives in a high-temperature environment caracal	A plant that lives in a high-temperature environment. palm tree
An animal that lives in a low-temperature environment. polar bear	A plant that lives in a low-temperature environment. pine tree

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- Study the figure in front of you and identify the different thermal zones on the diagram, and explain the reason for their variation.



The reason for their variation:
difference in inclination angle of sunrays

- Based on your study of the world map, identify one country located in each thermal zone.

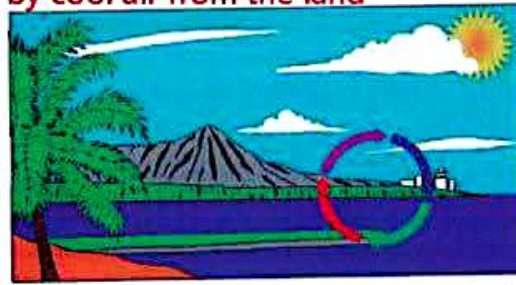
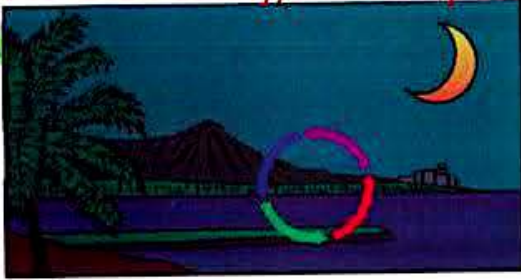
Country name	Thermal zone
Sudan	hot zone
Egypt	temperate
Russia	cold thermal zone

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Second term

specific heat of water is more than land so it heats up and cool down slower than land -- The air above the land during the daytime is hotter than the air above the sea. The rising of the hot air above the land (due to its low density) and it is replaced by cool air from the sea. The air above the sea at night is warmer than the air above the land. The rising of the warm air above the sea (due to its low density) and it is replaced by cool air from the land

Physical Changes in the Atmosphere



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land breeze

sea breeze

- The previous pictures represent land and sea breeze
Write the name of the phenomenon under each picture.

Explain how the temperature changes.....

تعالوا نتعلم صح مع مس عبيير

- Some of your friends went to the Saint Catherine Mountains on a climbing trip. Give a number of important instructions to ensure your friends' safety.

heavy clothes - oxygen cylinder



- Based on your previous analysis of the weather forecast, choose one day and determine:

Daily average temperature	Daily temperature range
	difference between maximum and minimum temp.

The arithmetic mean of the maximum and minimum temperatures for one day

- Why did the scale reading differ in the two cases?

due to difference in amount of air inside ball

- We conclude from that that:

Air has mass - weight



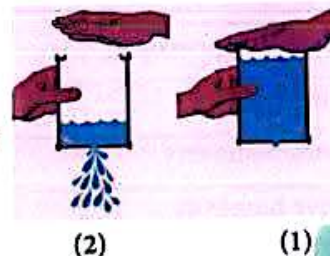
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bec atmospheric pressure of air upward is more than water pressure

- Why did the water fall in the case (2)?

bec pressure inside cup is more than outside

- We conclude from that that:
atmospheric air has pressure



Second Preparatory

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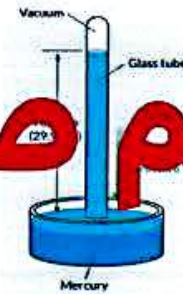
صفحة الفيس تعالوا

- The figure in front of you is used to measure ..atmospheric pressure

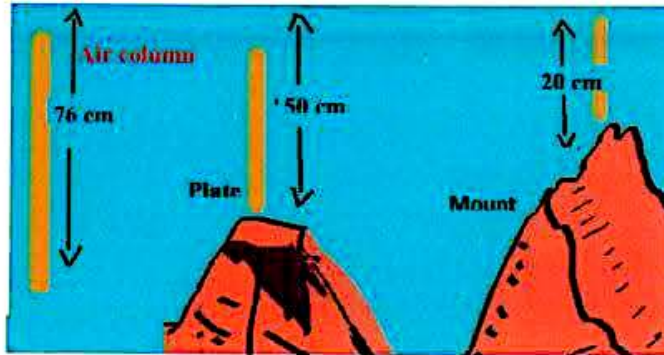
which is defined asMercury barometer.....

Its unit of measurement is

mm.Hg



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From the previous figure

- Which has higher atmospheric pressure: the mountain surface or the plateau surface? Explain your answer.
.....plateau surface as altitude increases pressure decreases.....
- State the factors that affect atmospheric pressure and explain the relationship between them.
.....Altitude - temperature - humidity (inverse relation).....
- using the textbook and in light of what you have studied, explain the meaning of the following terms

Weather	overall instantaneous condition of the atmosphere at certain place and time.
Climate	atmospheric condition in a certain place over a long period of time
Maximum temperature	highest temperature in one day
Minimum temperature	lowest temperature in one day
Daily average temperature	arithmetic mean of the maximum and minimum temperatures for one day
Daily temperature range	difference between maximum and minimum temp. for one day
Atmospheric pressure	weight of a column of air with a cross-sectional area of 1m ² and a height extending to the top of the atmosphere
Humidity	Amount of water vapor in air
Absolute humidity	actual mass of water vapour in certain volume of atmospheric air
Relative humidity	percentage of the actual amount of water vapour present in a certain volume of air (absolute humidity) to the maximum amount of water vapour that the same volume of air can hold at the same temperature (maximum capacity).

- 1- to measure air conditions and predict weather and climate
- 2- due to difference in inclination angle of sunrays
- 3- due to difference in specific heat of water and land The air above the land during the daytime is hotter than the air above the sea. The rising of the hot air above the land (due to its low density) and it is replaced by cool air from the sea

Physical Changes in the Atmosphere

4- due to difference in max and min temperature from city to another according to height above sea level - latitude - presence of water bodies



Homework Performances

5- bec it is affected by temp . humidity - height above sea level

State the scientific reason for: 6- bec when humidity increases pressure decreases

7- due to increase inclination angle of sunrays

1. The variety of weather and climate elements.
2. The existence of different thermal zones on the Earth's surface.
3. The occurrence of sea breeze.
4. The difference in the daily temperature range from one city to another.
5. The variation of atmospheric pressure from one region to another.
6. The effect of humidity on atmospheric pressure.
7. The decrease in temperature with increasing distance away from the Equator.

if maximum and minimum increase by the SAME amount Daily range stays the same (no change)

If minimum temperature increases MORE than maximum Daily range decreases

If maximum temperature increases MORE than minimum Daily range increases

What happens if:

1. Increase both of the maximum and minimum temperatures?
2. We move higher above sea level? temp . pressure decrease
3. The specific heat of water differs from that of land at night? land breeze occurs

Compare between:

1. Weather and Climate.

weather: overall instantaneous condition of the atmosphere at certain place and time.

climate: atmospheric condition in a certain place over a long period of time



Weekly Assessment

1- bec it affect human life and distribution of plants and animals on different areas

State the scientific reason for: 2- bec sun rays fall perpendicular on this area

3- bec specific heat of water is more than land The air above the sea at night is warmer than the air above the land The rising of the warm air above the sea (due to its low density) and it is replaced by cool air from the land

1. Temperature is considered the most important climatic element.

2. Areas close to the Equator are characterized by high temperatures.

3. The occurrence of land breeze.

4. Temperature decreases as we rise above sea level.

5. The daily average temperature differs from one city to another.

6. Atmospheric pressure decreases with increasing altitude above sea level.

7. Temperature affects atmospheric pressure.

8. Temperature is affected by differences in lines of latitude.

9. Temperature is affected near water bodies.

10. The rate of influenza spread increases in winter.

9- due to difference in specific heat between land and water

10- Due to low humidity of cold air

causes rapid evaporation of respiratory droplets carrying viruses allow them to remain suspended in air for long time

What happens if:

1. We move closer to or farther away from the Equator?
2. Humidity increases (with respect to pressure)?
3. Temperature increases (with respect to pressure)?

1- temperature - pressure increase near equator and decrease away from it

2- decreases

3- decreases

4- as we go up air expand and density decreases

5- due to difference in max and min temperature from city to another according to height above sea level - latitude - presence of water bodies

6- as we go up weight of air column decreases

7- bec by increasing temp . pressure increases

8- bec sun rays fall perpendicular on equator give it high effect of heat and as we go away from equator inclination of sunrays increases causes decreasing in temp

صفحة الفيس تعالوا نتعلم صح مع

Second Preparatory

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مس عير سمير

صفحة الفيس تعالوا

1. Daily average temperature and daily temperature range.
2. Land breeze and sea breeze.

Write the scientific term for:

نتعلم صح مع مس عير

1. The state of the atmosphere at a specific place over a short period of time. **weather**
2. The prevailing state of the atmosphere at a specific place over a long period of time. **climate**
3. The highest temperature in one day. **maximum temp**
4. The lowest temperature in one day. **minimum temp**
5. The weight of a column of air with a cross-sectional area of 1 m^2 and a height equal to the height of the atmosphere. **atmospheric pressure**
6. The amount of water vapor present in the air. **humidity**
7. The actual mass of water vapor present in a given volume of atmospheric air. **absolute humidity**



Q1: Write the scientific term indicated by the following statements:

1. A fixed point on which a rigid rod rests. **fulcrum**
2. Levers in which the fulcrum lies between the effort and the load. **first class levers**
3. Levers in which the effort lies between the load and the fulcrum. **third class levers**
4. Levers in which the load lies between the effort and the fulcrum. **second class levers**
5. The distance between the load (resistance) and the fulcrum. **load arm**
6. Specialized cells responsible for sexual reproduction in living organisms. **gamete**
7. Reproduction that occurs by two parent individuals of the same species, one male and the other female. **sexual reproduction**
8. The fusion of the nucleus of the male gamete (n) with the nucleus of the female gamete (n) to form a zygote carrying the full number of chromosomes (2n). **fertilization**
9. The unit of structure and function in living organisms. **cell**
10. A vital process in which a living organism produces new individuals of the same species, ensuring its continuity and protection from extinction. **reproduction**
11. The male reproductive organ in the flower, consisting of several stamens. **androecium**
12. The transfer of pollen grains from the anthers of one flower to the stigmas of another flower on a different plant of the same species. **cross polination**
13. A short stem whose leaves are modified to carry out reproduction in plants. **flower**
14. A cell formed by the fusion of the egg nucleus with the pollen nucleus and containing (2n) chromosomes. **zygote**

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first class levers

third class levers

second class levers

load arm

gamete

sexual reproduction

fertilization

cell

reproduction

androecium

cross polination

flower

zygote



صفحة الفيس تعالوا

On YouTube

second term

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Physical Changes in the Atmosphere

مس عبير

Q2: Complete the following statements:

1. Levers make tasks easier by increase force speed - distance - avoid danger.
2. The crowbar is a lever of the first class, while the hand broom is a lever of the third class.
3. A lever is in equilibrium when the moment of the effort equal the moment of the load.
4. A machine saves effort when its mechanical advantage is greater than 1.
5. Increasing the length of the effort arm leads to save effort.
6. Second-class levers differ from third-class levers in the position of load - save effort.
7. Examples of levers that increase speed are hockey bat.
8. First-class levers save effort when the E arm is greater than the load arm.
9. The effort arm equals the load arm in first levers.
10. The most common type of levers is the first class.
11. If the applied effort is half the load value and the load arm is 50 cm, then the effort arm equals 100 cm.
12. After fertilization, the ovary develops into a fruit while the ovules develop into seeds.
13. The floral whorl that protects the inner parts of the flower before blooming is the calyx.
14. Examples of unisexual flowers are the palm plant and the corn plant.

Q3: Correct the underlined words:

1. A bottle opener is a first-class lever. second
2. One function of levers is decreasing force as in the hand broom. increase
3. First-class levers differ from second-class levers in the presence of an applied force. fulcrum
4. A fishing rod is a second-class lever. third
5. Vegetative reproduction is a form of sexual reproduction. asexual
6. Gamete cells contain the full number of chromosomes found in somatic cells. half
7. Mitosis is known as reduction division. equational
8. Asexual reproduction depends on meiosis. mitosis
9. The first meiotic division is a mitotic division. second
10. Vegetative reproduction leads to genetic variation in the resulting individuals. sexual
11. In the second meiotic division, two cells are produced, each having half the original chromosome number (n). 4

Q4: Give reasons for the following:

1. Second-class levers save effort. bec effort arm is longer than load arm
2. Simple machines are of great importance in our lives. bec they help us make tasks easily
3. Effort and load can be equal only in first-class levers. bec effort arm sometimes = load arm in 1st class
4. Third-class levers do not always save effort. bec effort arm is shorter than load arm
5. A fixed pulley is considered a first-class lever. bec fulcrum is in the middle between E and L
6. Sexual reproduction leads to genetic variation among offspring due to crossing over phenomenon
7. The equality of chromosome numbers in somatic cells of different organisms does not mean they are genetically identical bec they carry different genetic traits (information)
8. Petals in many flowers are brightly colored and fragrant. to attract insects to help in pollination
9. Anthers hang outside the flowers of some wind-pollinated plants. to opened easily by wind
10. Pollen grains in insect-pollinated plants are sticky or rough to stick with insect body
11. The importance of the floral envelope in Narcissus flowers. to protect reproductive organs and attract insects
12. Wind-pollinated plants produce pollen grains in very large numbers. to compensate what lost in air

Second Preparatory

55

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Q5: What happens in the following cases?

1. Levers were not discovered.
..... **It will be hard to make some tasks**
2. The effort arm is longer than the load arm in levers.
..... **saves effort**
3. Anthers and stigmas do not mature at the same time.
..... **cross pollination occurs**
4. A pollen grain falls on the stigma of a flower of another species.
..... **pollination and fertilization won't occur**
5. The gynoecium is removed from a complete flower before it opens.
..... **cross pollination occurs**

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Q6: Compare between:

1. First-, second-, and third-class levers in terms of:
(definition – example – saving effort)
2. Somatic cells and gonads.
3. Sexual reproduction and Asexual reproduction.
4. Pollen grains in wind-pollinated flowers and pollen grains in insect-pollinated flowers.
5. Bisexual flowers and unisexual flowers.
6. Androecium and gynoecium in terms of structure and function.
7. Self-pollination and cross-pollination (definition and method).

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Q7: Mention the importance of each of the following:

1. Lever: **perform tasks easily by increasing speed - force - distance - avoid danger**
2. Forceps: **accuracy - pick very tiny objects**
3. Crowbar: **increase force**
4. Mitosis in humans: **body growth - repair damage cells - healing wounds**
5. Meiosis in humans: **produce gametes for sexual reproduction
reduce chromosome count in gamete to ensure restoring of original
number of chromosomes of species after mating**

Q8: Problems:

1. A first-class lever has an applied effort of 40 N and an effort arm of 5 cm. It acts on a load of 100 N.
 ○ Calculate the length of the load arm. $40 \times 5 = 100 \times \text{arm}$
 ○ Does the lever save effort or not? $40 \times 5 / 100 = 2 \text{ cm}$
saves effort
2. A lever is acted upon by an effort of 30 N with an effort arm of 20 cm, and a load of 20 N with a load arm of 10 cm.
 ○ Is the lever in equilibrium? Why? **no, bec moment of effort isn't equal moment of load**
 ○ If the lever is not in equilibrium, what should be the length of the load arm to achieve equilibrium

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moment of effort = effort x its arm = $30 \times 20 = 600$
 moment of load = load x its arm = $20 \times 10 = 200$

load arm = $30 \times 20 / 20 = 30 \text{ cm}$



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On YouTube

نتعلم صح مع مس عسر

حمل الآن

مجاناً وحصرياً

المراجعة رقم (3)

اختبار شهر ابريل



2

Levers

- Technological progress led to the use of machines to assist humans in performing arduous tasks that require great force.
- The Tower Crane (Winch) is considered an example of a compound machine, which is a machine consisting of many simple machines working together.

Discuss this lecture

The lecture includes the definition of levers, their law, types, and their importance in facilitating work.

Simple Machines



Fig. (2) Claw Hammer

Multiplies force to remove nails from wood.



Fig. (3) Tweezers

Used for precision and delicate work.



Fig. (4) BBQ Tongs

Used to avoid the risk of burns.



Fig. (5) Pulley

Changes the direction of force to lift or lower weights.

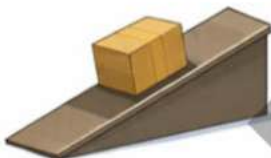


Fig. (6) Inclined Plane

Used to save effort.



Fig. (7) Wheel and Axle

Multiplies force or increases speed.



Fig. (8) Wedge

Changes the direction of the applied force.



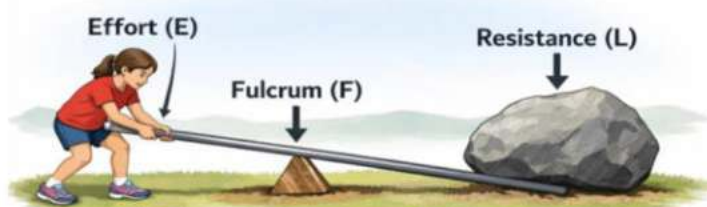
Fig. (9) Gears and Belts

Transmit motion and change speed, like in bicycles.

Levers:

It is a rigid bar (straight or curved) that moves around a point on it called the Fulcrum (axis of rotation) F , and is acted upon during use by a Force E and a Resistance (Load) L (Effort)

- Fulcrum: It is the fixed point around which the rigid bar of the lever rotates.
- Resistance (Load): The weight or object intended to be moved or acted upon by the lever.





Law of Levers

Activity 2: Practical

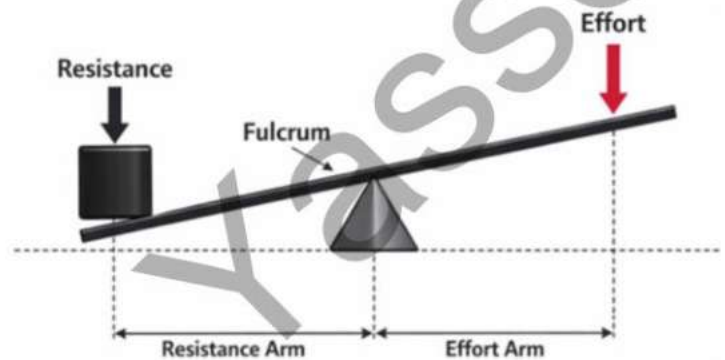
1. Suspend a weight at a distance of 2 cm to the right of the number balance fulcrum.
 - The balance tilts to the right side.
2. Suspend a similar weight at a distance of 5 cm to the left of the fulcrum.
 - The balance remains tilted to the right side, because the weight closer to the fulcrum does not equivalent [balance out] the farther weight.
3. Move the weight that is on the right to become at a distance of 5 cm from the fulcrum.
 - The balance equilibrates, as the two equal weights become at equal distances from the fulcrum.

Resistance Arm:

- It is the distance between the weight representing the resistance and the fulcrum.

Force Arm:

- It is the distance between the acting force and the fulcrum.

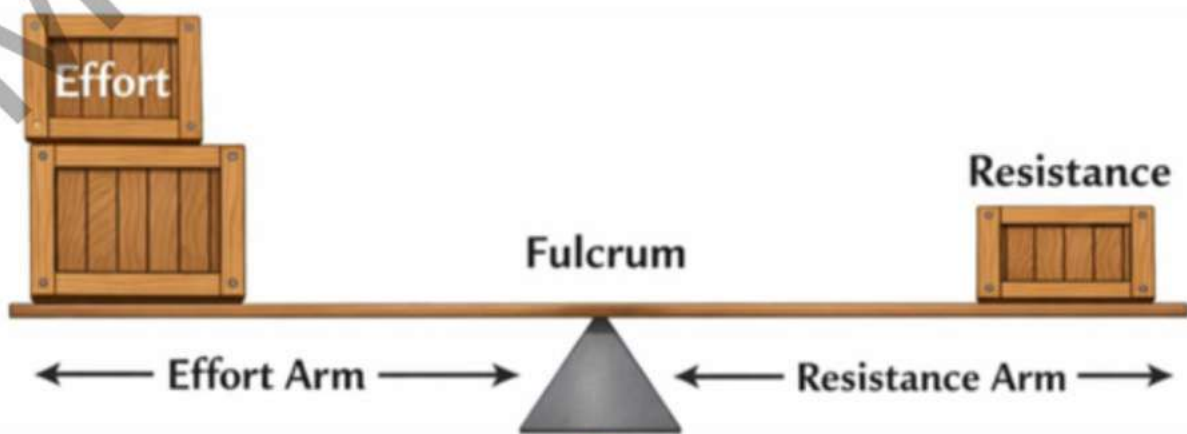


Levers :

The lever is in a state of equilibrium when the product of the force multiplied by its arm is equal to the product of the resistance multiplied by its arm.

$$\text{Force} \times \text{Force Arm} = \text{Resistance} \times \text{Resistance Arm}$$

- The product of the force multiplied by its arm is called the Torque of Force (or Moment of Force).
- The product of the resistance multiplied by its arm is called the Torque of Resistance (or Moment of Resistance).
- Meaning that the lever is in a state of equilibrium when the torque of force equals the torque of resistance.



Mechanical Advantage of the Lever:

The extent to which the lever saves effort is indicated through the concept of mechanical advantage, which is estimated from the following relationship:

$$\text{Mechanical Advantage} = \text{Resistance} / \text{Force} = \text{Length of Resistance Arm} / \text{Length of Force Arm}$$

- The machine provides effort saving when the value of its Mechanical Advantage is greater than 1.
- Increasing the length of the Force Arm leads to reducing the force required to lift the same weight.

Example : A weight of mass 2 kg was suspended 15 cm to the right of a lever's fulcrum, and another weight weighing 30 N representing the resistance was suspended to the left of the fulcrum at a distance of X cm, so the lever became in a horizontal position. (Given that the acceleration due to gravity equals 10 m/s²).

Calculate:

1. The value of the magnitude (X).
2. The Mechanical Advantage of this lever.

Step One: Calculating the Force (Weight) The mass of the weight suspended on the right must first be converted to weight (force) using the weight law:

$$\text{Weight (W)} = \text{Mass (m)} \times \text{Acceleration gravity (g)} = 2 \times 10 = 20$$

Step Two : Calculating the Resistance Arm (X) using the Law of Levers

$$\text{Force} \times \text{Force Arm} = \text{Resistance} \times \text{Resistance Arm}$$

$$\text{Force} = 20 \text{ N}$$

$$\text{Force Arm} = 15 \text{ cm}$$

$$\text{Resistance} = 30 \text{ N}$$

$$\text{Resistance Arm (X)} = ?$$

$$\text{Resistance Arm (X)} = 10 \text{ cm.}$$

Step Three : Calculating the Mechanical Advantage $30 / 20 = 1.5$

Conclusion : Since the Mechanical Advantage (1.5) is greater than 1, this lever saves effort.



Types of Levers

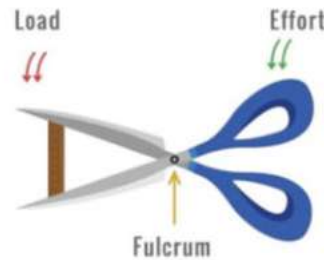
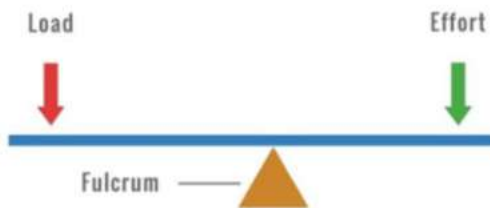
- The type of lever and its importance are determined according to the relative position of the Force (E), the Resistance (L), and the Fulcrum (F).

1. First Class Lever

- **Definition:** It is the lever in which the Fulcrum (F) is located between the Force (E) and the Resistance (L).
- **Examples:** Pliers, scissors, seesaw, and crowbar.

Important Note: All first-class levers change the direction of the force, but regarding saving effort: some save effort, and others do not save effort (depending on the position of the fulcrum).

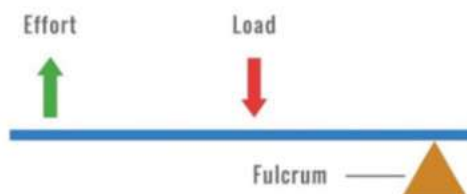
First Class



2. Second Class Levers:

- **Definition:** These are levers in which the point of resistance application lies between the fulcrum and the point of force application.
- **Examples:** Wheelbarrow, nutcracker, and lemon squeezer.
- **Important Note:** All second-class levers always save effort; the reason is that the Force Arm in them is always longer than the Resistance Arm.

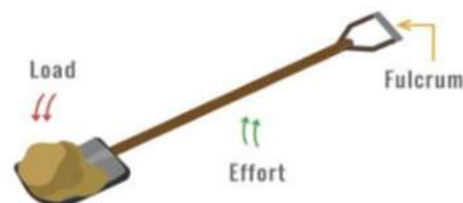
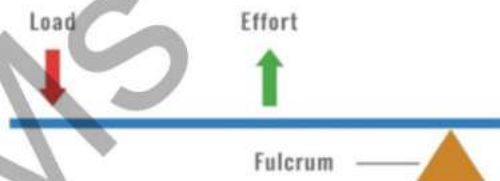
Second Class



3. Third Class Levers:

- **Definition:** These are levers in which the point of force application lies between the fulcrum and the point of resistance application.
- **Examples:** Tennis racket, manual broom, and coal holder (tongs) or tweezers.
- **Important Note:** These levers do not save effort, but they are used for precise or hazardous work.

Third Class



Integration with Biology (Levers in the Human Body)

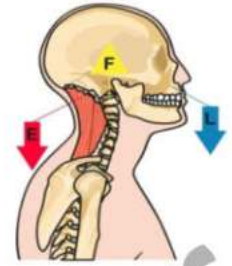
The Skeletal System acts as a system of levers:

- Bones represent the levers.
- Joints represent the fulcrums.
- Muscle contraction force represents the Force.
- The weight to be overcome represents the Resistance.



The Head (First Class Lever)

- The meeting point of the skull with the spinal column represents the Fulcrum. The posterior neck muscles represent the Force pulling the head backward, while the weight of the head (the front part) represents the Resistance tilting it forward. The goal is to maintain balance so the head remains upright.



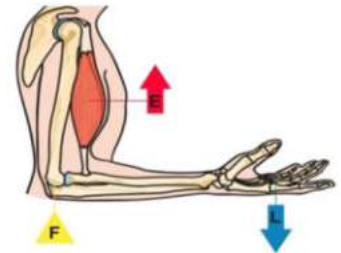
The Foot when standing on tiptoes (Second Class Lever)

- Fulcrum: The tips of the toes touching the ground.
- Resistance: The entire body weight pressing in the middle.
- Force: The posterior leg muscles (calf) lifting the heel upward.
- Since the Resistance (Weight) is in the middle, it is a second-class lever.



The Upper Arm / Forearm (Third Class Lever)

- Fulcrum: The elbow joint.
- Force: The Biceps muscle (upper arm muscle).
- Resistance: The weight carried in the palm of the hand.
- Since the Force is located between the Fulcrum and the Resistance, it is a third-class lever.



Lesson Two: Questions

Multiple Choice Questions

1. Which of the following machines is considered a first-class lever?
 (a) Nutcracker (b) Wheelbarrow (c) Scissors (d) Coal tongs
2. In second-class levers, the is located in the middle.
 (a) Force (b) Resistance (c) Fulcrum (d) Force arm
3. The nutcracker is considered a lever of the:
 (a) First class (b) Second class (c) Third class (d) Fourth class
4. The distance between the force and the fulcrum is called:
 (a) Resistance arm (b) Displacement (c) Moment (d) Force arm
5. Third-class levers do not always save effort because:
 (a) Force arm > Resistance arm (b) Force arm < Resistance arm
 (c) Force = Resistance (d) Fulcrum is in the middle
6. The wheelbarrow always saves effort because it is a lever of the:
 (a) First class (b) Second class (c) Third class (d) Compound
7. The law of levers at equilibrium states:
 (a) Force $\times$ its arm = Resistance $\times$ its arm (b) Force + Resistance = Zero
 (c) Force $\times$ Resistance = Force arm (d) Force $\div$ its arm = Constant
8. If the force arm is longer than the resistance arm, the lever:
 (a) Does not save effort (b) Is always balanced (c) Saves effort (d) Does not move
9. The bones of the head and neck in the human body act as a lever of the:
 (a) First class (b) Second class (c) Third class (d) Not considered a lever
10. In which of the following levers can the force arm equal the resistance arm?
 (a) Coal tongs (b) Wheelbarrow (c) Seesaw (d) Nutcracker
11. The foot bone represents a lever of the:
 (a) First class (b) Second class (c) Third class (d) Compound
12. In a manual broom, the lower hand is the:
 (a) Resistance (b) Weight (c) Axis of rotation (d) Force

13. If the force is 50 Newtons and its arm is 10 cm, and the resistance is 100 Newtons, for the lever to balance, the resistance arm must be:

- (a) 5 cm (b) 10 cm (c) 20 cm (d) 50 cm

14. The lever used to increase speed is of the:

- (a) First class (b) Second class (c) Third class (d) All of the above

15. Which of the following machines is a "compound machine"?

- (a) Tower crane (b) Crowbar (c) Scissors (d) Tweezers

16. The human arm is considered a lever of the:

- (a) First class (b) Second class (c) Third class (d) Fourth class

17. When the acting force is smaller than the resistance, the lever:

- (a) Saves effort (b) Does not save effort (c) Breaks (d) Stops

18. All of the following are functions of levers except:

- (a) Magnifying force (b) Transferring force (c) Reducing speed (d) Accuracy in work

19. For a lever to save effort, the ratio between the force arm and the resistance arm must be:

- (a) Equal to 1 (b) Greater than 1 (c) Less than 1 (d) Zero

20. The lever where the force is between the resistance and the fulcrum is:

- (a) Scissors (b) Soda bottle opener (c) Crowbar (d) Sweet tongs

21. If the length of the force arm is half the length of the resistance arm, the force is:

- (a) Half the resistance (b) Double the resistance
(c) Equal to resistance (d) Quarter of resistance

22. The common balance (two-pan scale) is an example of a lever that:

- (a) Does not save effort (b) Always saves effort
(c) Increases speed (d) Increases distance

23. In second-class levers, the force is always the resistance.

- (a) Greater than (b) Equal to (c) Smaller than (d) Double

Fill in the Blanks

1. A lever consists of a rigid bar acted upon by and and rotates around a fixed point.
2. The class of levers always saves effort, while the class never saves effort.

3. The force arm is the distance between and
4. Tweezers and coal tongs are levers of the class, while the nutcracker is a lever of the class.
5. In the human body, the head and neck bones represent a lever of the class, and the foot bones represent a lever of the class.
6. The force can equal the resistance only in levers of the class.

Write Scientific Term

1. A rigid bar that moves around a fixed point and is acted upon by a force and a resistance.
2. The fixed point on which the lever rotates.
3. The distance between the fulcrum and the point of force application.
4. The distance between the fulcrum and the point of resistance application.
5. Levers where the fulcrum is located between the force and the resistance.
6. Levers where the resistance is located between the force and the fulcrum.
7. Levers where the force is located between the resistance and the fulcrum.
8. The product of the force multiplied by its arm.
9. Levers used for accuracy in work or avoiding dangers and do not save effort.
10. The weight intended to be moved by the lever.

Mark (✓) or (X) with correction

1. All levers work to save effort.
2. The wheelbarrow is a second-class lever and always saves effort.
3. In third-class levers, the force arm is always smaller than the resistance arm.
4. First-class levers can save effort if the force arm is larger than the resistance arm.
5. Tweezers are used to magnify force.
6. If the force arm equals the resistance arm, the lever does not save effort.
7. The nutcracker is a first-class lever.
8. In the state of lever equilibrium, the moment of force equals the moment of resistance.
9. The crowbar saves effort because the force arm in it is smaller than the resistance arm.
10. In the skeletal system, the joint represents the fulcrum.

Give Reasons (Explain)

1. Second-class levers always save effort.

2. Third-class levers never save effort.

.....

3. Although some levers do not save effort, they are useful to humans.

.....

4. First-class levers can save effort or not save it.

.....

5. Scissors are considered a first-class lever.

.....

6. The wheelbarrow is considered a second-class lever.

.....

7. The force arm in sweet tongs is smaller than the resistance arm.

.....

8. The force is always smaller than the resistance in the nutcracker.

.....

What Happens When...

1. Increasing the length of the force arm over the length of the resistance arm in a lever.

.....

2. The length of the force arm equals the resistance arm.

.....

3. The presence of resistance between the force and the fulcrum.

.....

4. The presence of force between the resistance and the fulcrum.

.....

5. Applying a small force on the long arm of a crowbar.

.....

6. Moving the fulcrum in a first-class lever to be very close to the force.

.....

Comparisons

1. First-class levers and Second-class levers

.....

2. Crowbar and Sweet Tongs (regarding type and benefit)

.....

Essay Questions

1. A first-class lever, the force acting on it is 50 Newtons and its arm length is 20 cm, acts on a resistance of 200 Newtons. Calculate the length of the resistance arm necessary for the lever's equilibrium.

.....

2. Mention the functions of levers.

.....

3. Problem: A lever has a force arm length of 40 cm and a resistance arm length of 10 cm. Does this lever save effort? And why?

.....

4. Classify the following machines according to lever type: (Seesaw - Soda bottle opener - Tweezers).

.....

5. Problem: If the force acting on a lever is 400 Newtons and the resistance is 100 Newtons, and the resistance arm is 20 cm. Calculate the force arm.

.....

6. Explain how the skeletal system works as a lever system (mentioning an example).

.....

7. Problem: A balanced lever, its total length is 100 cm, the fulcrum is exactly in the middle. A resistance of 60 Newtons was hung at one end. What is the magnitude of the force needed at the other end to cause equilibrium?

.....

8. Observe the image shown before you then answer:

a) What is the mechanical benefit of using this tool?

b) Classify this type of lever.

c) Does this lever save effort? And why do we use it?

.....



9. Observe the figure before you then answer:

- a) This figure represents a lever of which type?
 - b) What represents the "Resistance" in this figure?
 - c) Where is the fulcrum located?
-



Ms. Doaa Yasser



unit 3

Reproduction in living organisms

- **Lesson One: Cell Division**
- **Lesson two: floral reproduction**

1

Cell Division

- One of the most important vital processes that occur in living organisms, whether they are unicellular or multicellular.
- Necessary for the growth of the living organism, compensating for damaged or lost cells, and completing the reproduction process in some organisms.
- Depends on the genetic material existing inside the cell nucleus, which consists of chromosomes.

Discuss this lecture ✕

The concept of the cell and its importance, cell types, and asexual reproduction, with an explanation of mitosis and meiosis in growth, reproduction, and genetic diversity.

Types of Cells in Living Organisms

Somatic Cells	Reproductive Cells
Like skin cells, liver, muscles.	Like: Testis and Ovary in humans and animals. Anther and Ovary in plants.
Contain the complete number of chromosomes ($2n$).	Contain the complete number of chromosomes ($2n$).
Depend on Mitotic division.	Depend on Meiotic division to produce gametes.

Gametes or Sex Cells

- Produced from gonad cells by meiotic division and contain half the number of chromosomes (n).

Like

Sperms and Ovums (eggs) in humans and animals and Pollen grains and Ovums in plants.

For example:

The somatic cell in humans contains ~~46~~ chromosomes ($2n=46$), while the gamete (sperm or ovum) contains ~~23~~ chromosomes ($n=23$).

Reproduction:

- It is a vital process aiming to produce new individuals of the same species to guarantee its continuity and protect it from extinction.

Asexual Reproduction (Non-mating)

- It is the process of producing new individuals from one parental individual only, without the need for specialized reproductive systems or gametes.

Characteristics of Asexual Reproduction

1. Occurs through one parent.
2. Depends on **Mitotic Division** of cells.
3. Produces a large number of offspring in a relatively short time.
4. Does not lead to genetic variation among the resulting individuals.
5. Does not require specialized reproductive organs or structures (mostly).
6. Resulting individuals are completely identical to the parent in genetic traits (carrying an exact copy of the parent's genetic material).
7. **Common in unicellular organisms** (like Amoeba, Bacteria, Yeast fungus) and some multicellular organisms (like Hydra, Starfish, some plants).



Vegetative Reproduction (An example of Asexual Reproduction)

Occurrence:

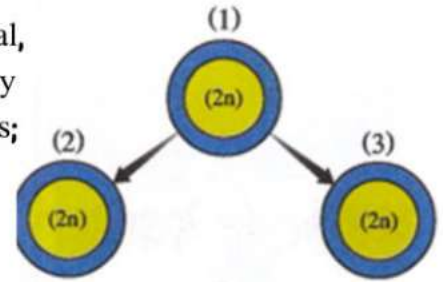
- Occurs in some plants without the need for seeds.
- Potato tubers are considered a clear example of vegetative reproduction.
- How it grows: When a piece of the tuber is placed in suitable conditions, the bud becomes active to form a small stem growing upwards carrying leaves, and at the same time, primary roots form extending into the soil.
- Function of the tuber: The tuber piece acts as a store for energy (stored food) to supply the stem and roots with the necessary growth in the beginning.
- Transformation into a full plant: With the development of roots to absorb water and salts, and the rising of the stem and leaves towards the light, the new plant becomes capable of making its own food via the photosynthesis process.

Types of Cell Division

- There are two main types of cell division: Mitotic Division and Meiotic (Reduction) Division.

First: Mitotic Division

- In it, one cell ($2n$) divides into two new cells ($2n$) that are identical, which involves distributing a complete and exactly matching copy of the genetic information of the original cell to the two new cells; that is why it is called Equal Division.
- Asexual reproduction depends on the occurrence of mitotic division, which involves creating an exact copy of the parental individual.



Place of occurrence:

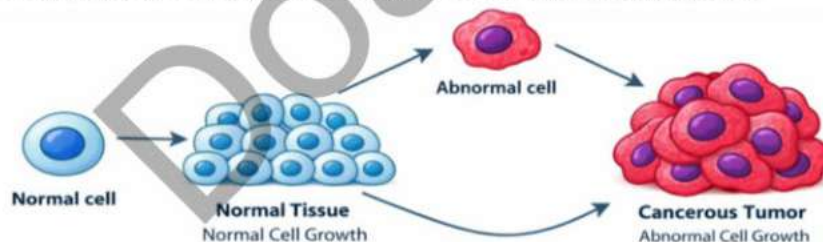
- Occurs in all somatic cells of higher living organisms (except nerve cells and mature red blood cells in mammals, because they do not contain a nucleus).

Its Importance:

1. Growth of the living organism: Increasing the number of cells allows the growth of the organism from childhood to adulthood.
2. Compensating for dead and damaged tissues: Such as the healing of skin wounds, blood vessels, and bone fractures.
3. Completing the process of asexual reproduction: In some unicellular organisms and some multicellular organisms that reproduce asexually.

Integration with Medical Science: Cancer Tumor

- Cancer is a disease resulting from the continuous and abnormal mitotic division of some body cells, leading to the formation of a mass of cells called a cancerous tumor.



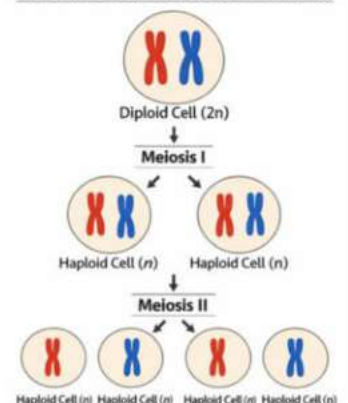
Second: Meiotic (Reduction) Division

- In it, one cell divides into four cells, each containing half the number of chromosomes (n) existing in the original cell ($2n$); that is why it is called Reduction Division.

Steps of Meiotic Division:

- First Meiotic Division: Results in two cells, each containing half the original number of chromosomes (n).
- Second Meiotic Division: It is a mitotic division, resulting in four cells, each having half the original number of chromosomes (n), then each transforms into a sperm, ovum, or pollen grain.

Meiotic Division (Reduction Division)



Place of occurrence:

- Occurs in Reproductive Cells (Gonad cells) in higher living organisms that reproduce sexually. Such as testis cells in the male to produce sperms, ovary cells in the female to produce ovums, anther cells in plants to produce pollen grains, and ovary cells in plants to produce ovums.

Its Importance:

- Formation of Gametes (Sex Cells): Necessary for completing the sexual reproduction process.

Give Reason (Why): Mitotic division is important for a child's body, unlike Meiotic division.

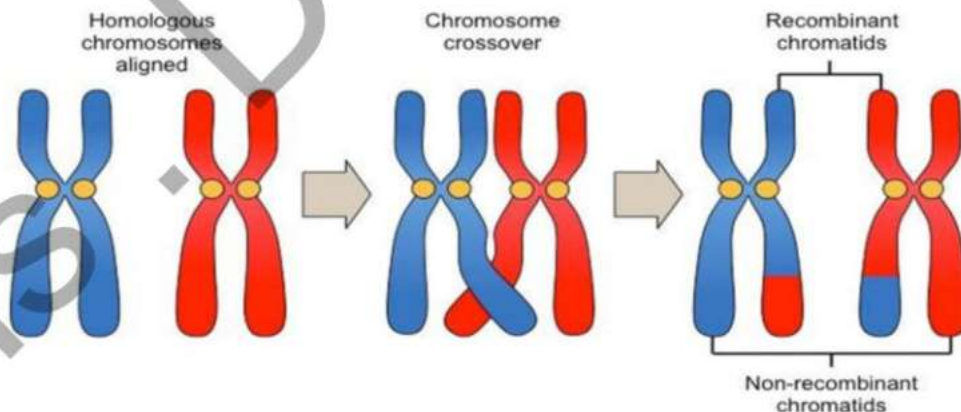
- Because: Mitotic division leads to growth which the child's body needs and compensates for damaged and lost cells when a wound or bone fracture occurs, whereas Meiotic division leads to the formation of gametes which are needed by adults only to complete sexual reproduction.

Genetic Diversity :

- Meiotic division is characterized by producing genetically different cells, as the process of Genetic Crossing Over occurs between homologous chromosomes during the first meiotic division, and this process allows for the diversity of genetic traits in individuals of the same species.

Crossing Over Phenomenon:

It is a process of exchanging genes between the two inner chromatids of the tetrad



Its Importance: The crossing over phenomenon works on the diversity of genetic traits in individuals of the same species... Why?

- Because in it, an exchange of genes carrying genetic traits in the DNA molecule takes place between the two inner chromatids of the two homologous chromosomes in every tetrad

11. Asexual reproduction produces individuals that are

- | | |
|---------------------------------------|--------------------------------|
| (a) Genetically different | (b) Identical to the parent |
| (c) Contain half the genetic material | (d) Resulting from two parents |

12. Meiosis occurs in flowering plants in the

- | | | | |
|------------|----------|----------|------------|
| (a) Anther | (b) Stem | (c) Root | (d) Leaves |
|------------|----------|----------|------------|

13. When planting a piece of a potato tuber, it must contain to ensure growth.

- | | | | |
|-----------|----------|-------------|-----------|
| (a) Roots | (b) Buds | (c) Flowers | (d) Seeds |
|-----------|----------|-------------|-----------|

14. Which of the following is considered a function of mitosis?

- | | |
|----------------------|------------------------------|
| (a) Gamete formation | (b) Genetic diversity |
| (c) Wound healing | (d) Reduction of chromosomes |

15. The number of chromosomes in a human female ovum is

- | | | | |
|--------|--------|--------|--------|
| (a) 46 | (b) 23 | (c) 44 | (d) 22 |
|--------|--------|--------|--------|

16. The division that leads to the growth of a child from childhood to adulthood is

- | | | | |
|-------------------|--------------------|-------------|--------------------|
| (a) First Meiosis | (b) Second Meiosis | (c) Mitosis | (d) Binary fission |
|-------------------|--------------------|-------------|--------------------|

17. Vegetative reproduction is considered a type of reproduction.

- | | | | |
|-------------|----------------------|------------|-------------|
| (a) Asexual | (b) Gamete-dependent | (c) Sexual | (d) Meiotic |
|-------------|----------------------|------------|-------------|

18. The cells resulting from meiosis are called

- | | | | |
|------------|------------|-------------|-------------|
| (a) Zygote | (b) Embryo | (c) Tissues | (d) Gametes |
|------------|------------|-------------|-------------|

19. Which of the following is "NOT" considered a characteristic of asexual reproduction?

- | | |
|--------------------------------|-----------------------------|
| (a) Occurs via one parent | (b) Provides many offspring |
| (c) Achieves genetic diversity | (d) Relies on mitosis |

Fill in the Blanks

1. The male gamete in humans contains chromosomes, while the muscle cell contains chromosomes.

2. division aims to repair damaged tissues, while division aims to form gametes.

3. Examples of unicellular organisms that reproduce asexually are and

4. The reproductive organs (gonads) in plants are called (for male) and (for female).

5. Asexual reproduction relies on division, while sexual reproduction relies on division.

6. Potatoes reproduce vegetatively via

Write Scientific Term

1. A biological process aiming to produce new individuals of the same species to protect it from extinction.
2. Cells produced from meiosis containing half the number of chromosomes.
3. A disease resulting from the continuous and abnormal mitotic division of body cells.
4. A process of gene exchange between the inner chromatids of the tetrad leading to genetic diversity.
5. Cell division occurring in somatic cells resulting in two identical cells.
6. Reproduction that does not require reproductive systems and relies on a single parent.
7. An underground food-storing stem used in the vegetative reproduction of the potato plant.
8. Division resulting in four cells, each with half the number of chromosomes (n).
9. Cells that contain the full number of chromosomes and divide mitotically.
10. The male reproductive organs (gonads) in humans and animals.
11. The female reproductive organs (gonads) in plants that produce ovules.

Mark (✓) or (X) with correction

1. Asexual reproduction produces individuals genetically different from the parents.
2. The sperm contains the same number of chromosomes found in the ovum.
3. Meiosis occurs in liver and skin cells.
4. The second meiotic division is considered a mitotic division in terms of method and numerical results of chromosomes inside the cell.
5. The phenomenon of crossing over occurs during mitosis and causes genetic diversity.
6. The potato tuber is an adventitious root that stores food.
7. A cancerous tumor results from cells dividing naturally and regularly.
8. Sexual reproduction maintains the genetic consistency of traits.
9. Mitosis aims for the growth of the organism and compensation for damaged parts.
10. Plants can reproduce vegetatively without the need for seeds.

Give Reasons (Explain)

1. Mitosis is called equational division.

2. Meiosis is a source of genetic diversity in living organisms.

3. Meiosis is called reduction division.

4. Individuals produced by asexual reproduction are an identical copy of the parent.

5. The importance of mitosis for children is greater than for adults.

6. Vegetative reproduction in potatoes is considered asexual reproduction.

7. The danger of continuous abnormal mitotic division.

What Happens When...

1. A somatic cell divides mitotically.

2. Continuous and abnormal mitotic division occurs in some body cells.

3. The crossing over phenomenon does not occur during meiosis.

4. Planting a piece of a potato tuber that does not contain buds.

5. A reproductive cell (like the testis) divides meiotically.

6. A child suffers a bone fracture (regarding cell division).

Comparisons

1. Mitosis and Meiosis

2. Somatic Cells and Reproductive Cells (Gonads)

3. Asexual Reproduction and Sexual Reproduction

Essay Questions

1. Problem: If the number of chromosomes in a pancreas cell of a rabbit is 44 chromosomes. Calculate the number of chromosomes in: a) Rabbit ovum. b) Rabbit liver cell. c) Rabbit ovary cell.

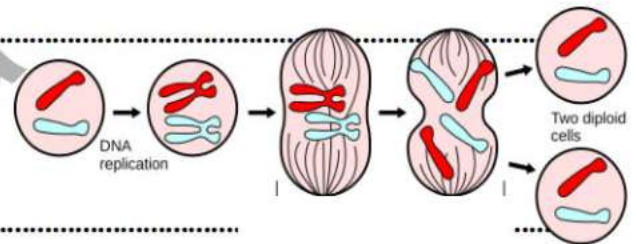
2. How does a potato tuber form and turn into a complete plant?

3. Mention three examples of somatic cells in humans and two examples of reproductive cells (organs).

4. What is cancer? And how does it arise?

5. What is the type of division shown in the figure?

And what is its importance?



6. A reproductive cell in an organism contains 20 chromosomes, it divided meiotically. What is the number of resulting cells and the number of chromosomes in each?

7. What is the importance of Meiosis?

8. What is the name of the phenomenon shown in the figure? And what is its importance?



2

Floral Reproduction

Flowering Plants

- Flowering plants are considered one of the most widely spread types of plants around the world. They are the plants most related to humans, as they constitute a primary source for their food.
- Flowering plants rely on the process of sexual reproduction, which takes place mainly through flowers, to maintain the continuity of their species.

Discuss this lecture ✕

The concept of cell division and its types (mitotic and meiotic), its importance in growth, reproduction, and cell replacement, and its role in gamete formation and achieving genetic diversity.

Origin of the Flower

The flower originates from a vegetative bud modified to perform the process of reproduction.

- **Origin:** The flower usually emerges from the axil of a leaf known as the Bract.
- If a part of the plant stem bears more than one flower, this gathering is called an Inflorescence, and the part of the stem bearing these flowers is called the Inflorescence Axis (or Peduncle).

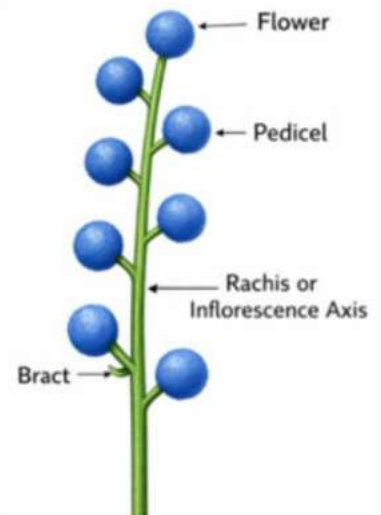


Forms of Inflorescences vary, and they are classified in the text into three main types of simple inflorescences:

1. Simple Racemose Inflorescences

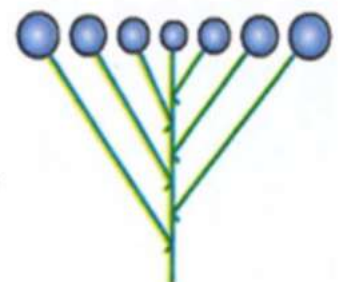
These inflorescences are characterized by the presence of one long main axis that continues to grow. This axis bears flowers in all directions, and each flower is carried on a small stalk.

- **Shape:** This arrangement gives the inflorescence a shape resembling a bunch of grapes.
- **Blooming:** Flowers bloom from the lower part (older flowers) to the upper part (younger flowers).
- **Examples:** Snapdragon plant and Stock plant.



2. Simple Corymbose Inflorescences

These inflorescences are characterized by the presence of one short main axis that stops growing after forming a number of flowers. The flowers grow on the sides of the axis only.



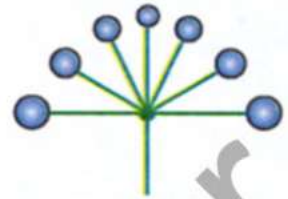
- **Shape:** This arrangement gives the inflorescence a shape resembling a comb.
- **Blooming:** Flowers bloom from the outside (older flowers) to the inside (younger flowers).
- **Level:** Almost all flowers are at one level, distinguishing them from racemose inflorescences.
- **Examples:** Cherry plant and Candytuft (Iberis) plant.



3. Simple Umbellate Inflorescences

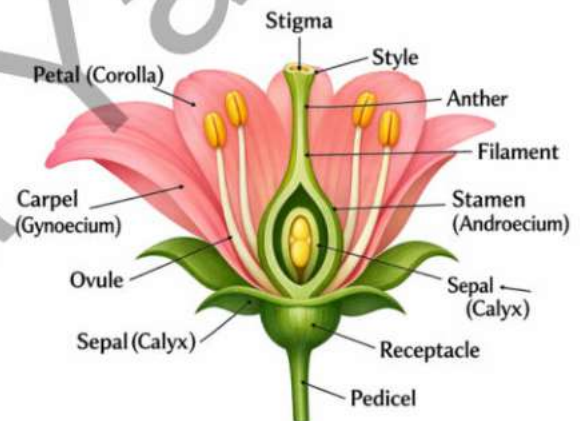
These inflorescences are characterized by all flowers emerging from a single point at the end of the stem.

- **Shape:** This arrangement gives the inflorescence a shape resembling a tent or umbrella.
- **Stalks:** The stalks of the flowers are equal in length.
- **Blooming:** Flowers bloom from the outside (older flowers) to the inside (younger flowers).
- **Examples:** Garlic plant and Onion plant.



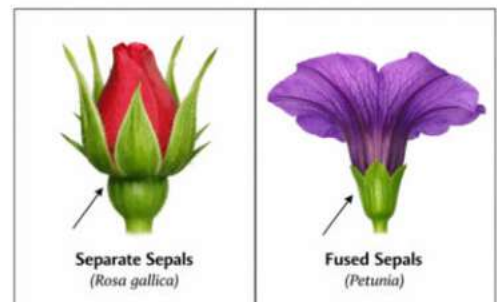
Structure of the Flower

- The flower is the organ of sexual reproduction in flowering plants.
- A typical flower consists of four floral whorls arranged in groups, all carried by a swollen area at the end of the flower stalk called the Receptacle.
- A typical flower consists of four main floral whorls, from the outside to the inside: Calyx, Corolla, Androecium, and Gynoecium.



A. The Calyx

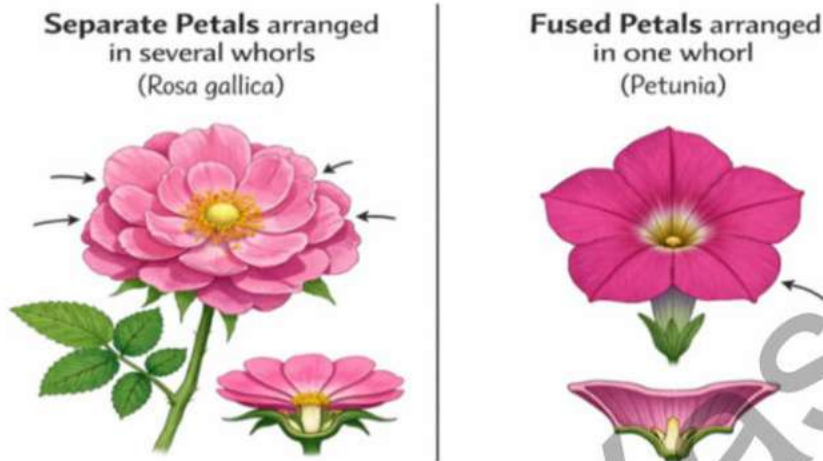
- **Structure:** Consists of green leaves called Sepals. Their number varies from one flower to another.
- **Shape:** Sepals may be separate, as in the Rose flower, or fused, as in the Petunia flower.
- **Function:** Protecting the internal parts of the flower, especially before it blooms.



B. The Corolla

- **Structure:** Follows the calyx from the inside and consists of thin white or colored leaves called Petals. They are often characterized by a pleasant scent (Give reason: to attract insects).

- **Number and Arrangement:** The number of petals is often equal to the number of sepals and alternates with them in position. Petals may be arranged in one fused whorl, as in the Petunia flower, or in several separate and arranged whorls, as in the Rose flower.
- **Function:** Protecting the floral reproductive organs, in addition to attracting insects that play an important role in completing the floral reproduction process (Pollination).



Special Cases in Flower Structure

There are some flowers that differ in their structure from the typical flower in terms of distinguishing the floral whorls:

Narcissus Flower:

Sepals cannot be distinguished from petals in terms of color and shape; the calyx and corolla whorls together are called the Perianth.

Naked Flowers:

Flowers in which sepals and petals are absent (i.e., there is no calyx or corolla whorl), such as Willow flowers.



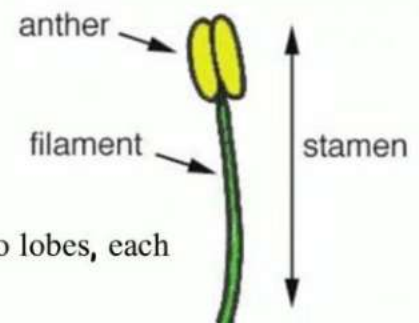
Figure (14): Willow flowers



Figure (13): Daffodil flower

C. The Androecium - Male Organ

- The Androecium is the third whorl from the inside, following the corolla. It consists of several leaves called Stamens.
- **Structure of the Stamen:**
 - **Filament:** A thin part that carries the anther.
 - **Anther:** A swelling at the end of the filament, often containing two lobes, each containing two sacs filled with pollen grains (male gametes).



D. The Gynoecium - Female Organ

The Gynoecium is the fourth whorl and is found in the center of the flower. It consists of leaves called Carpels, which resemble a flask.

• Structure of the Carpel:

- **Ovary:** A swelling found at the base of the carpel containing ovules (female gametes).
- **Style:** A thin neck connecting the ovary to the stigma.
- **Stigma:** A sticky disc at the end of the style.



Sex of the Flower

The sex of the flower is classified based on the presence or absence of male and female organs in it:

1. Bisexual (Hermaphrodite):

Contains both male and female organs (Androecium and Gynoecium together). Symbol: ♂
 Examples: Tomato and Eggplant flowers.

2. Unisexual:

Contains only one of the reproductive organs.
 Examples: Palm, Corn, Pumpkin flowers.
 Female: Contains the Gynoecium only (without Androecium). Symbol : ♀
 Male: Contains the Androecium only (without Gynoecium). Symbol : ♂.

Integration with Medical Science: Medical Benefits of Flowers

The medical benefits of flowers are numerous due to their content of antioxidants and volatile oils, such as:

1. Chamomile Flowers: Used as a sedative for nerves.
2. Hibiscus Flower: Used to lower high blood pressure.
3. Lavender Flowers: Used to relieve muscle pain and headaches.



Chamomile flowers



Hibiscus flower



Lavender flowers

Entrepreneurship and Health Awareness

Some villages are famous for growing roses, and their petals are used in manufacturing products of economic value such as rose water and rose oil.



Preventive Awareness (Hay Fever):

Hay Fever

Some villages are famous for growing roses, and their petals are used in manufacturing products of economic value such as rose water and rose oil.

- It can be avoided by staying away from areas where the percentage of pollen grains increases.

Pollination and Fertilization in Flowers



First: Pollination

Pollination :

It is the process of the transfer of pollen grains from the anthers of stamens (male organs) to the stigmas of carpels (female organs).

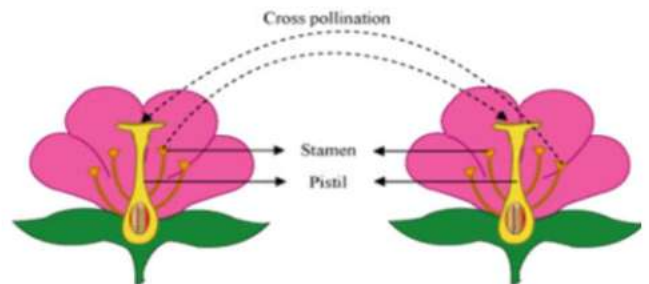


Pollination is divided into two main types:



1. Cross Pollination

It is the transfer of pollen grains from the anther of a flower on a plant to the stigma of another flower on another plant of the same species.



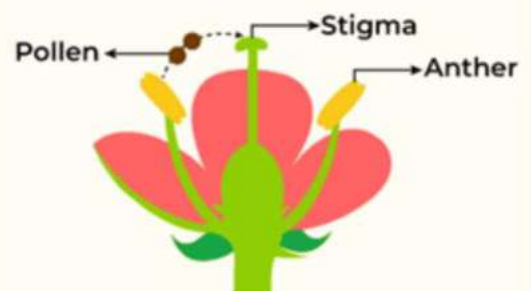
Reasons for occurrence:

- Non-maturation of the Androecium and Gynoecium at the same time.
- Presence of Anthers at a lower level than Stigmas (far from them).
- The flowers being unisexual.



2. Self Pollination

It is the transfer of pollen grains from the anther of a flower to the stigma of the same flower, or to the stigma of another flower on the same plant.



Reasons for occurrence:

- Maturation of the Androecium and Gynoecium at the same time.
- Presence of Anthers at a level equal to Stigmas or slightly higher than them.
- Some flowers remain closed and do not open until pollination is completed.



Means of Pollen Transfer



- Plants rely on external media such as (Wind, Insects, Water, and Humans) to transfer pollen grains. The characteristics of the flower adapt to the method it uses:



1. Cross Pollination by Wind

Flowers pollinated by wind are characterized by features that help them spread and receive pollen easily:

- **Petals:** Small in size and their colors are not bright.
- **Scent:** Odorless and contain no nectar.
- **Anthers:** Long and hanging outwards (to facilitate their opening by wind).
- **Pollen Grains:** Light, dry, and smooth to be easily carried by wind, and produced in very large numbers to compensate for the loss.
- **Stigmas:** Feathery, sticky, and outside the flower to be able to catch pollen grains from the air.



2. Cross Pollination by Insects

These flowers are characterized by features that attract insects (such as bees and butterflies):

- **Petals:** Large in size with bright colors (to attract insects).
- **Scent:** Often scented and secrete nectar to attract insects.
- **Anthers:** Located inside the flower due to the short filament.
- **Pollen Grains:** Sticky or rough to stick to the bodies of visiting insects.
- **Stigmas:** Sticky and located inside to catch pollen grains from the insect's body when it visits the flower.



Note : Light and smooth pollen grains are designed for transport via wind, while sticky or rough pollen grains are designed for transport via insects.



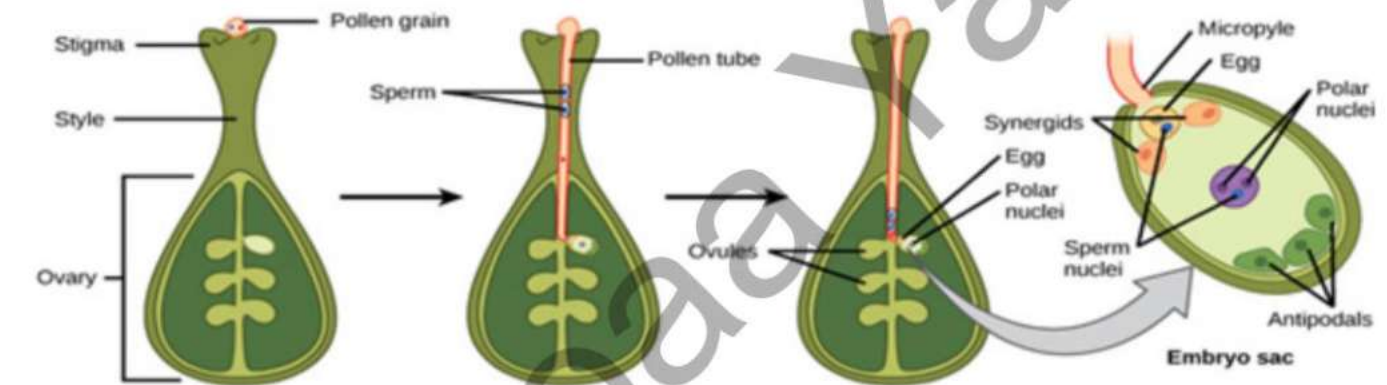
Second: Fertilization and Fruit Formation



The fertilization process begins after pollination, where the pollen grain falls on the stigma of a flower of the same species.

Steps of the Fertilization Process:

1. **Formation of Pollen Tube :** The stigma secretes a sugary solution absorbed by the pollen grain, so it germinates forming a tube called the pollen tube.
2. **Division of Generative Nucleus:** The generative nucleus of the pollen grain divides mitotically to form two male nuclei (n).
3. **Arrival of the Tube:** The pollen tube extends inside the style until it reaches the ovule through the micropyle opening.
4. **Fertilization:** The tip of the pollen tube dissolves, and fertilization occurs by the fusion of one of the two male nuclei with the egg nucleus, forming a fertilized egg (Zygote) which is diploid (2n).
5. **Embryo Formation:** The zygote divides mitotically to form the embryo, which grows to form the seed upon germination.



Fruit Formation

After fertilization, the following changes occur in the parts of the flower:

- **Ovary:** The ovary ripens, transforming into a fruit.
- **Ovules:** The ovules inside the ovary transform into seeds.
- **Floral Whorls:** The calyx, corolla, androecium, stigma, and style usually wither and fall off.

Exceptional cases of remaining whorls:

- The Calyx may remain as in Tomato and Eggplant.
- The Corolla may remain as in Cucumber and Zucchini.
- The Stamens and Sepals may remain as in Pomegranate.



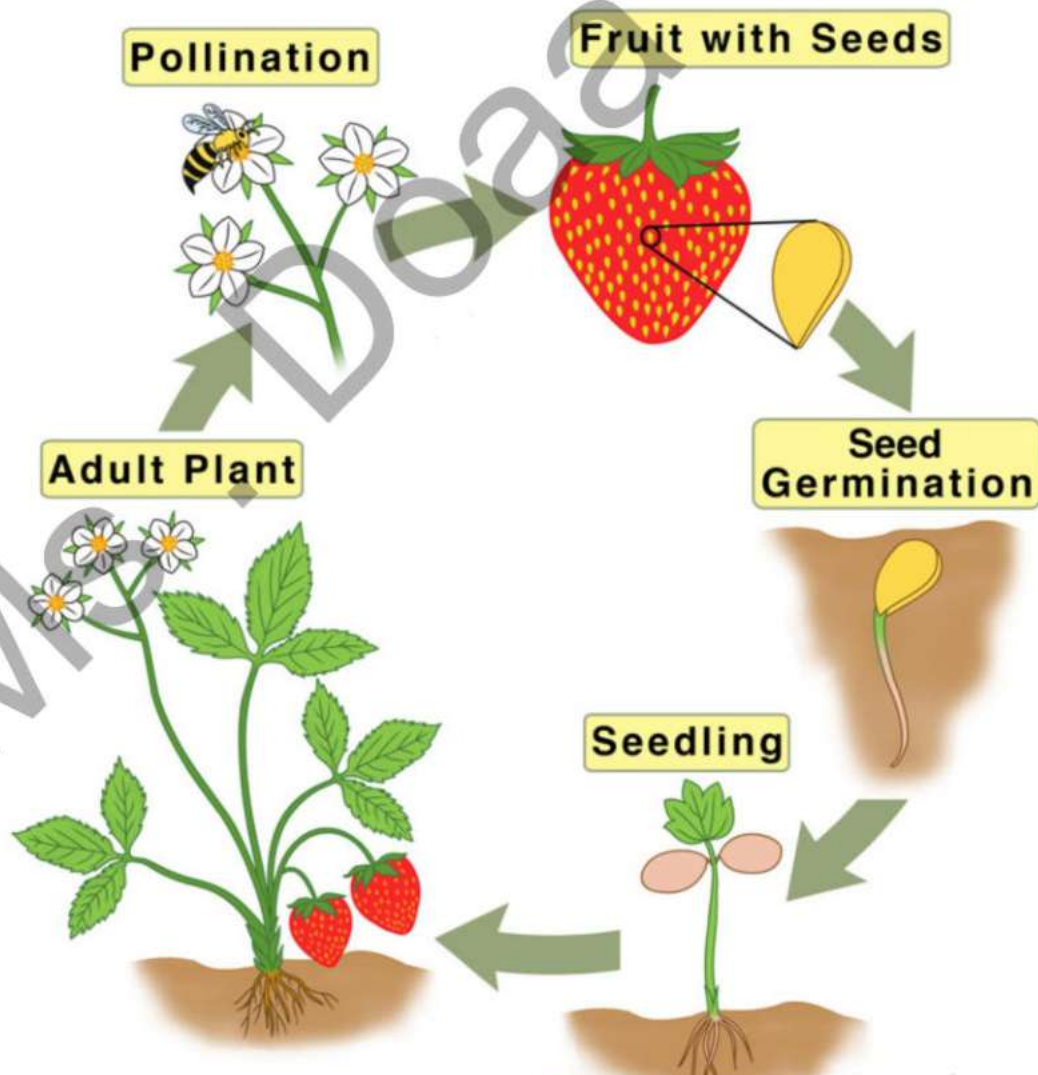
Q: Why does the peach fruit contain one seed, while the pea pod contains many seeds?

A: This is due to the number of ovules inside the ovary. If the ovary contains one ovule (as in Peach), one seed is formed. If it contains many ovules (as in Peas), many seeds are formed.

Life Cycle of Flowering Plants

The life cycle of flowering plants passes through four sequential main stages:

1. **Germination:** The seed transforms into a seedling that begins to emerge from the soil.
2. **Vegetative Growth:** The plant begins to form roots, stems, and leaves, and grows to become a mature plant.
3. **Reproduction:** The mature plant begins to form flowers that reproduce to form fruits containing seeds inside.
4. **Seed Dispersal:** Seeds spread in various ways to fall in a new place, to begin a new life cycle.



Lesson Two: Questions

Multiple Choice Questions

1. The organ responsible for forming female gametes in the flower is:
 (a) Anther (b) Ovary (c) Style (d) Filament
2. The grouping of flowers on the floral axis is called:
 (a) Bract (b) Calyx (c) Inflorescence (d) Receptacle
3. A flower in which the calyx leaves cannot be distinguished from the corolla is known as:
 (a) Flower with Perianth (b) Naked flower (c) Typical flower (d) Unisexual
4. Flowers in Simple Racemose inflorescences open from:
 (a) Top to bottom (b) Inside to outside (c) Bottom to top (d) Outside to inside
5. Which of the following plants has "naked" flowers?
 (a) Narcissus (b) Petunia (c) Tulip (d) Willow
6. The number of floral whorls in a Petunia flower is:
 (a) 2 (b) 3 (c) 4 (d) 1
7. Seeds are formed inside fruits as a result of the transformation of:
 (a) Ovules (b) Ovary (c) Pollen grains (d) Carpels
8. The "Snapdragon" plant is characterized by inflorescences of the type:
 (a) Simple Corymb (b) Simple Raceme (c) Simple Umbel (d) Compound
9. In the municipal Rose flower, the sepals are:
 (a) Fused (b) Colored (c) Absent (d) Separate
10. Which of the following is a condition for self-pollination to occur?
 (a) Maturation of androecium and gynoecium together (b) The flower is unisexual
 (c) Anthers are lower than stigmas (d) Presence of nectar
11. A plant whose petals consist of one fused whorl:
 (a) Municipal Rose (b) Stock (c) Onion (d) Petunia
12. The substance that causes Hay Fever is:
 (a) Nectar (b) Cellulose (c) Pollen grains (d) Chlorophyll
13. The fusion of a male nucleus with the egg nucleus results in a:
 (a) Fruit (b) Seed (c) Zygote (d) Embryo directly

14. Pollen grains transmitted by wind are characterized by being:

- (a) Rough and heavy (b) Dry and light (c) Sticky and large (d) Few in number

15. Cherry plant flowers are an example of inflorescences:

- (a) Corymbose (b) Racemose (c) Umbellate (d) Compound

16. In which of the following plants do the corolla leaves (petals) remain after fruit formation?

- (a) Eggplant (b) Pomegranate (c) Cucumber (d) Tomato

17. Fertilization in flowering plants occurs inside the:

- (a) Stigma (b) Style (c) Anther (d) Ovary

18. The Androecium consists of leaves called:

- (a) Carpels (b) Petals (c) Sepals (d) Stamens

19. Boiled Camomile flowers are used medicinally as a:

- (a) Antihypertensive (b) Painkiller (c) Nerve sedative (d) Antibiotic

20. An example of plants whose fruits contain many seeds:

- (a) Peach (b) Pea (c) Olive (d) Apricot

21. In insect-pollinated flowers, the anthers are:

- (a) Hanging outside (b) Inside the flower (c) Absent (d) Atrophied

22. The Androecium, Stigma, and Style usually wither after:

- (a) Fertilization (b) Pollination (c) Germination (d) Flower opening

Fill in the Blanks

- The flower originates from a vegetative bud that usually emerges from the axil of a leaf called the
- In the Narcissus flower, the outer whorl that combines the calyx and corolla is called the ...
- The male organ in the flower is the while the female organ is the
- After fertilization, the ovule turns into a while the ovary turns into a
- Flowers of wind-pollinated plants are characterized by stigmas to catch pollen.
- The Calyx consists of green leaves called while the Corolla consists of colored leaves called

7. One of the two male nuclei fuses with the egg nucleus to form the which divides to form the
8. Flowers in a Racemose inflorescence open from the to the

Write Scientific Term

1. A short stem whose leaves are modified to form the reproductive organs in the plant.
2. A grouping of flowers emerging on a single floral axis in various arrangements.
3. A green or scale-like leaf from whose axil a flower emerges.
4. The process of pollen transfer from the anther of a flower to the stigma of another flower on a different plant of the same species.
5. The floral whorl consisting of colored leaves with a pleasant scent, functioning to attract insects.
6. Flowers completely devoid of calyx and corolla, such as Willow flowers.
7. The process of the fusion of the male cell nucleus with the egg nucleus to form the zygote.
8. A cell resulting from the fusion of the male nucleus with the egg containing the full number of chromosomes ($2n$).
9. A swelling at the end of the flower pedicel upon which the floral whorls are arranged.
10. A swelling at the end of the stamen filament containing pollen sacs.
11. A small opening in the ovule through which the pollen tube enters to complete fertilization.
12. A flower containing both male and female organs.
13. Inflammation caused by the immune system's response to pollen, leading to sneezing and tearing.

Mark (✓) or (X) with correction

1. A typical flower consists of only three floral whorls.
2. In the Onion plant, the inflorescence takes a shape resembling a tent or umbrella.
3. Pollination is the process of the fusion of the pollen grain with the ovule.
4. Pollen grains in insect-pollinated plants are rough or sticky.
5. The fruit arises from the maturation of the ovule, while the seed arises from the maturation of the ovary.
6. Date palm flowers are unisexual.

7. The calyx remains attached to the fruit in the Eggplant.
8. Hibiscus flowers are used to lower high blood pressure.
9. The pollen grain contains two male nuclei immediately before the pollen tube germinates.
10. Snapdragon flowers are arranged in a simple racemose inflorescence.
11. Self-pollination always occurs in unisexual flowers.
12. The zygote divides meiotically to form the embryo.

Give Reasons (Explain)

1. The petals of insect-pollinated flowers are characterized by bright colors and a pleasant scent.
.....
2. Wind-pollinated flowers produce pollen grains in huge numbers.
.....
3. The stigmas of wind-pollinated flowers are feathery and sticky.
.....
4. Cross-pollination may occur in hermaphrodite (bisexual) flowers despite the presence of both sexual organs.
.....
5. The peach fruit is considered single-seeded, while the pea fruit is many-seeded.
.....
6. "Hay fever" patients are advised to stay away from planted areas in certain seasons.
.....
7. The importance of the presence of a sugary solution on the stigma.
.....
8. The anthers of wind-pollinated flowers hang outside.
.....

What Happens When...

1. A pollen grain falls on the stigma of a flower of the same species.
.....
2. The androecium and gynoecium mature at the same time in a hermaphrodite flower.
.....

3. The ovary contains several ovules after fertilization is complete.

4. The anthers are located at a lower level than the stigmas in a hermaphrodite flower.

5. Stripping a flower of its calyx leaves before it opens.

6. The pollen tube reaches the micropyle.

Comparisons

1. Self-Pollination and Cross-Pollination

2. Simple Racemose Inflorescence and Simple Corymbose Inflorescence

Essay Questions

1. Trace the steps of the fertilization process in a flowering plant from the landing of the pollen grain until the formation of the zygote.

2. Briefly explain the life cycle of flowering plants (The four stages).

3. Mention three medical benefits of flowers, stating the name of the flower and the benefit.

4. What happens to the following floral parts after fertilization: (Calyx - Corolla - Androecium - Ovary - Ovule)?

5. Explain how the flower of a plant pollinated by insects adapts to ensure pollination occurs.

6. Classify simple inflorescences according to the shape of the axis and the arrangement of flowers.

7. Mention one exceptional case for each of: (Persistence of Calyx - Persistence of Stamens).

.....

8. What is the relationship between the "Micropyle" and seed formation?

.....

Ms. Doaa Yasser

unit 4

Physical changes in the atmosphere

- **Lesson One: The effect of temperature and pressure on climate formation**
- **Lesson Two: Winds and weather forecasts**

1

The Effect of Heat and Pressure on the Formation of Climate

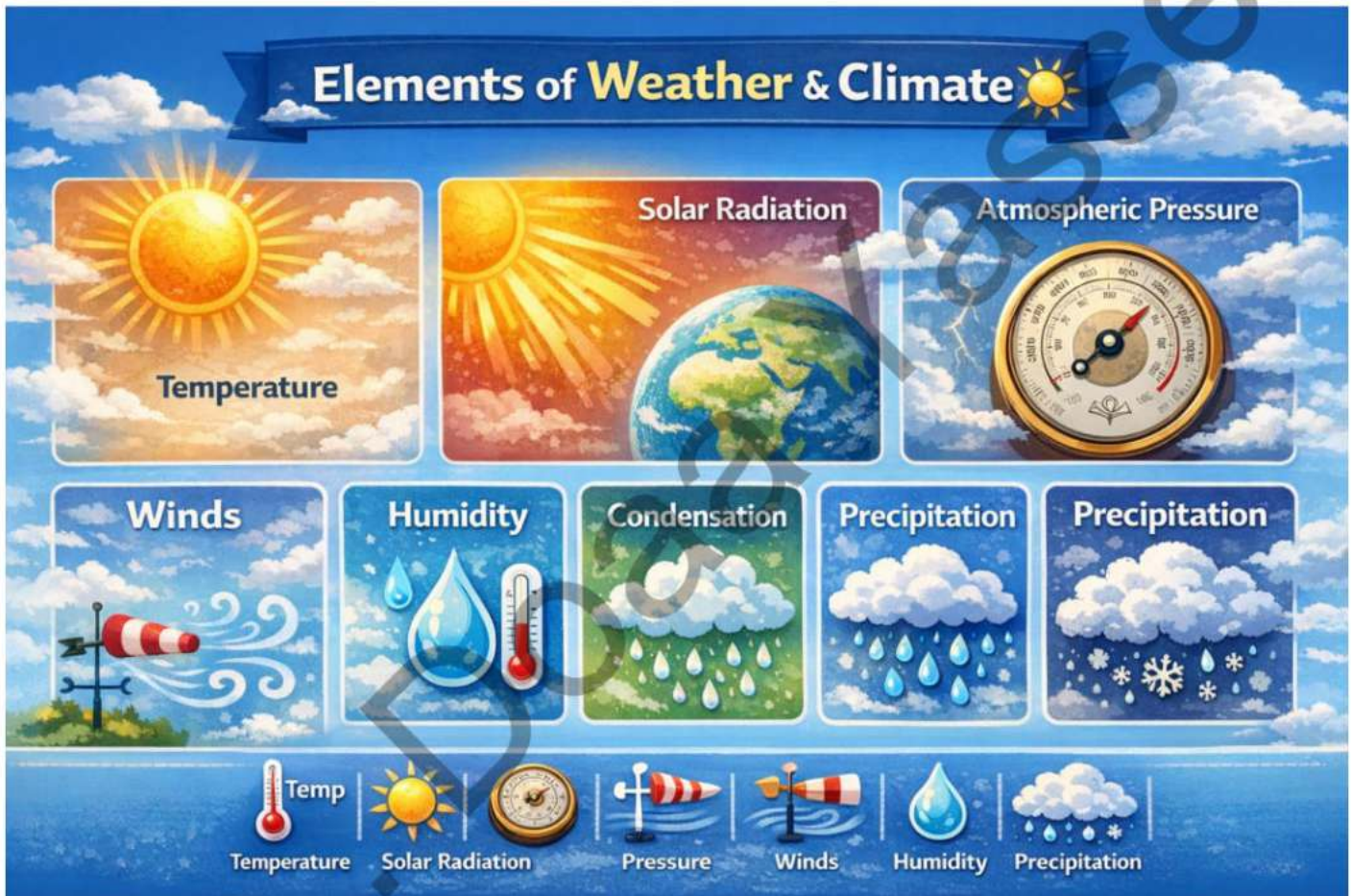
Weather:

It is a description of the state of the atmosphere in a specific place during a short period of time (hour, day, week) and it is constantly changing.

Climate:

It is the state of the atmosphere or the prevailing condition in a specific place during a long period of time (months, years, decades).

Elements of Weather & Climate



First: Temperature:

Temperature is considered the most important climatic element due to its direct effect on human life and the distribution of plants and animals on the surface of the Earth.

Factors Affecting Temperature

1. Difference in Latitudes

- Whenever we get closer to the Equator (latitude 0°), the temperature increases. And whenever we head north or south towards the Poles (90° North or South), the temperature decreases.

- **At the Equator:** The sun's rays fall perpendicularly or semi-perpendicularly; this means that the same amount of solar energy concentrates on a small area, leading to intense heating.
- **At the Poles:** The sun's rays fall very obliquely. This makes the same amount of energy distribute over a very wide area, and the result is much less heating.

2. Proximity to Water Bodies

- Coastal areas (close to seas and oceans) enjoy a milder atmosphere than interior areas (desert [ones]).
- The reason is the high specific heat of water compared to land, as it makes water bodies colder than the land adjacent to them by day, causing sea breeze, and warmer by night, causing land breeze.

Sea Breeze:

oThe land heats up faster than the sea water. The hot air over the land rises upwards (because it is less dense), so cold air coming from over the sea surface takes its place.

SEA BREEZE & LAND BREEZE



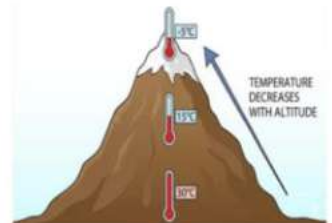
Land Breeze:

oThe land loses its heat faster than the water, so it becomes colder than the sea water. Where the warm air rises from over the sea surface, and colder air coming from the land takes its place.



3. Altitude Above Sea Level

- Whenever we rise upwards above sea level, the temperature decreases.



The Reason:

Air Expansion:

When air rises upwards, the atmospheric pressure upon it decreases, so it expands. This expansion process consumes energy, leading to a decrease in the air temperature.

Decrease in Density:

At high altitudes, the air is less dense, and its molecules (air particles) are distant from each other. This makes its ability to retain heat less.

- **Example: We find snow on mountain peaks even if they are located in hot regions.**

Calculations Related to Temperature

Used in meteorology.



Maximum Temperature

The highest temperature recorded in a single day (usually in the afternoon period).





Minimum Temperature

The lowest temperature recorded in a single day (usually before sunrise).





Daily Average Temperature

(Maximum Temperature + Minimum Temperature) ÷ 2

It is the average of the maximum temperature and the minimum temperature.



Daily Thermal Range (Diurnal Range)

It is the difference between the maximum temperature and the minimum temperature.

Thermal Range =
Max. Temp. - Min. Temp.




Second: Atmospheric Pressure

Practical Activity (1): The Balloons Experiment

Scientific Goal: Proving that air has weight.

Materials: Two identical balloons having the same volume / a rod / a pin.

Steps:

1. Fixing the rod in a horizontal position.
2. Hanging the two balloons to form a balanced lever of the first type.
3. Puncturing one of the balloons with a sharp pin.

Observation:

- As soon as the air exited, an imbalance of the lever occurred; the end carrying the inflated (intact) balloon drops downwards, while the end carrying the punctured (empty) balloon rises.

Conclusion:

- The end that dropped downwards is the "heavier" one. This means that the balloon filled with air is heavier than the empty balloon. The only difference between them is the presence of air. Therefore, air has weight.



Practical Activity (2): The Egg and Bottle Experiment

Scientific Goal:

Proving the existence of pressure for atmospheric air.

Materials:

A peeled boiled egg / a bottle / a piece of paper / a matchstick.

Steps:

1. A peeled boiled egg is placed on the mouth of a bottle. The egg does not fall inside because its size is slightly larger than the mouth.
2. The egg is lifted temporarily, and a small piece of paper is lit and thrown inside the bottle.
3. The egg is placed again quickly on the mouth before the flame goes out.

Observation:

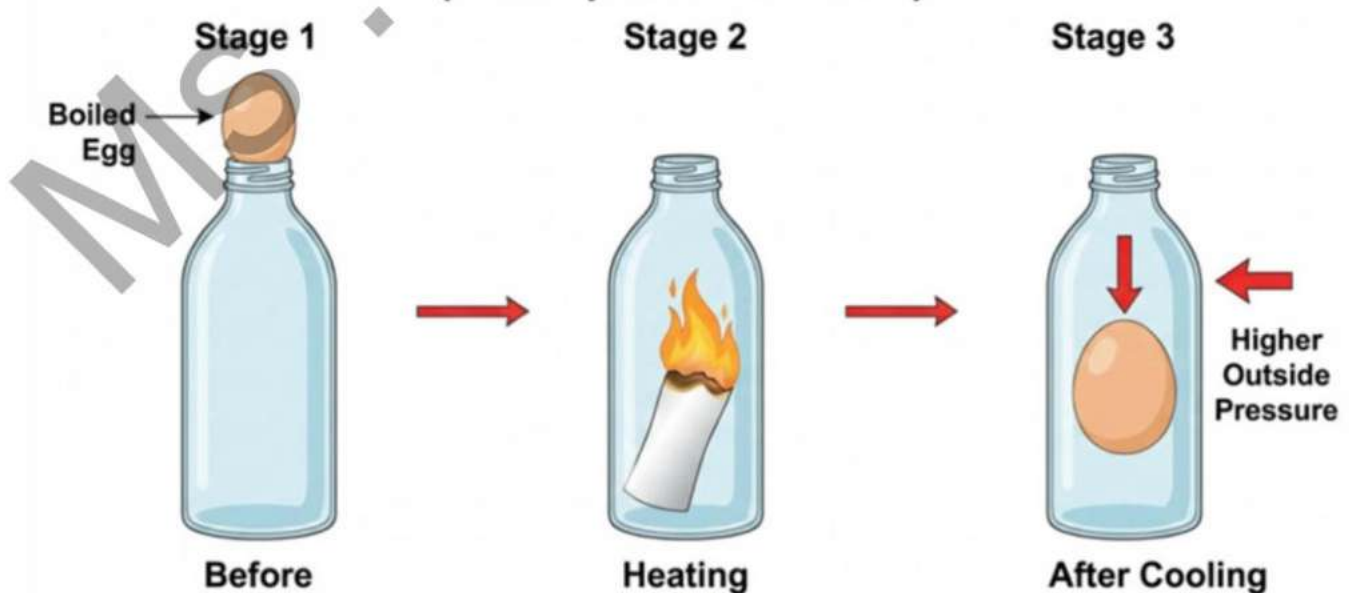
- After the flame goes out, the egg is pulled forcefully inside the bottle and falls into it.

Conclusion:

1. The Natural State: Air pressure outside the bottle and inside it is equal, therefore the egg does not move.
2. Upon burning the paper: The air inside the bottle heats up, so it expands and part of it exits.
3. After the flame extinguishes: The remaining air inside the bottle cools quickly, so it shrinks and its pressure decreases significantly.
4. The Result: The air pressure outside the bottle (atmospheric pressure) becomes much higher than the low pressure inside it. This large difference in pressure generates a force pushing the egg from the outside to the inside.

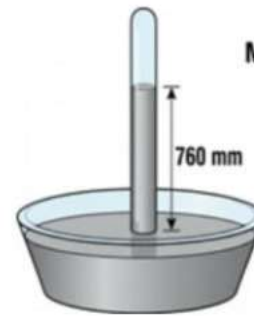
This proves that air has pressure, and that this pressure is strong enough to push objects

EGG AND BOTTLE EXPERIMENT (Atmospheric Pressure)



Atmospheric Pressure:

It is the weight of a column of air whose cross-sectional area is 1 m^2 and whose length is the height of the atmosphere and is measured via the mercury barometer device.



MERCURY BAROMETER

Standard Atmospheric Pressure at Sea Level
 $= 760 \text{ mm Hg}$
 $= 1013.25 \text{ mb}$

Standard Atmospheric Pressure:

It is the atmospheric pressure at sea level and it equals the weight of a column of mercury whose length is **76 cm (760 mm.Hg)** acting upon a unit area, and it is equivalent to **1013.25 millibars**.

Mathematical Understanding:

Every **1 millibar (mb)** equals **0.75 mm** of mercury (mm.Hg).

$$\text{Pressure (mb)} = \text{Pressure (mm.Hg)} / 0.75$$



$$1 \text{ millibar} = 0.75 \text{ mm of mercury}$$

$$\text{Pressure (mb)} = \text{Pressure (mm.Hg)} / 0.75$$



Applied Example :

If the standard atmospheric pressure is **760 mm.Hg**, then how much does it equal in millibars?

$$\text{Pressure (millibar)} = 760 \text{ mm.Hg} / 0.75 \approx 1013.3 \text{ millibars.}$$

Factors Affecting Atmospheric Pressure

ALTITUDE	TEMPERATURE	HUMIDITY
Higher Altitude → Lower Pressure	Higher Temp → Lower Pressure	Higher Humidity → Lower Pressure

1. Altitude Above Sea Level

- Whenever we rise above sea level, the weight of the length of the atmospheric air column acting upon a unit area decreases, and consequently atmospheric pressure decreases.

2. Temperature

- Upon the rise of the Earth's surface temperature, the air close to it expands, leading to a decrease in its density, and consequently a decrease in atmospheric pressure, and vice versa.

3. Humidity

- Humidity is the quantity of water vapor present in the air.
- The percentage of humidity differs from one place to another and from one timing to another.

Absolute Humidity:

The actual mass of water vapor present in a specific volume of atmospheric air and is estimated in the unit (g/m³)

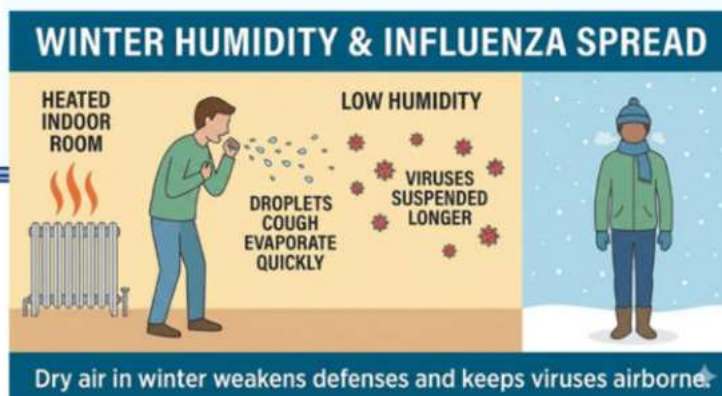
Relative Humidity:

It is the percentage ratio between the mass of water vapor actually present in a specific volume of air (absolute humidity) and the maximum mass of water vapor that the same volume of air can hold at the same temperature (maximum capacity)

Atmospheric pressure decreases slightly upon the increase of humidity, because the density of water vapor is less than the density of dry air.

Integration with Biology :

The spread of influenza increases in the winter season, because cold air has low humidity. And upon heating the air inside buildings with the stability of absolute humidity, relative humidity drops sharply, which works on evaporating droplets rapidly, which increases the remaining of viruses suspended in the air for a longer period of time, and also the evaporation of water from mucous membranes lining the nose and the respiratory system, which weakens their ability to resist viruses



Lesson One: Questions

Choose the correct answer:

1. Description of the state of the atmosphere in a specific place during a short period is known as:
 (a) Climate (b) Weather (c) Atmospheric Pressure (d) Humidity
2. The animal that lives in hot regions is:
 (a) Polar Bear (b) Fox (c) Penguin (d) Egyptian Lynx
3. Sun rays fall at the poles (90° North and South) in a form that is:
 (a) Perpendicular (b) Semi-perpendicular (c) Very oblique (d) Non-existent
4. The air touching the land at night in the land breeze phenomenon is:
 (a) Hot and rises (b) Cold and high density (c) Very humid (d) Low pressure
5. The device used to measure atmospheric pressure is:
 (a) Mercury Barometer (b) Anemometer (c) Thermometer (d) Hygrometer
6. The standard atmospheric pressure at sea level equals mm Hg.
 (a) 76 (b) 760 (c) 1013 (d) 1000
7. The relationship between air temperature and its density is a relationship that is:
 (a) Direct (b) Constant (c) Inverse (d) Irregular
8. Moist air has an atmospheric pressure that is compared to dry air.
 (a) Higher (b) Lower (c) Equal (d) Double
9. The spread of influenza increases in winter due to the decrease in:
 (a) Atmospheric Pressure (b) Wind Speed (c) Humidity (d) Specific Heat
10. Sun rays fall perpendicular, so energy is concentrated in a small area at:
 (a) The Poles (b) Europe (c) Tropic of Cancer only (d) The Equator
11. The lowest temperature recorded in the day is usually:
 (a) At noon (b) Immediately after sunset (c) Midnight (d) Before sunrise
12. The standard atmospheric pressure is estimated at millibars.
 (a) 1000 (b) 1013.25 (c) 760 (d) 76

13.The ability of air to retain heat decreases at high altitudes due to:

- | | |
|-----------------------------------|--------------------------------|
| (a) Spacing of air molecules | (b) Closeness of air molecules |
| (c) Increase in oxygen percentage | (d) Decrease in wind |

14.At the equator, sun rays are distributed over a area, causing intense heating.

- | | | | |
|----------|-----------|------------|---------------|
| (a) Wide | (b) Small | (c) Medium | (d) Unlimited |
|----------|-----------|------------|---------------|

Complete the following:

1. Climate is the prevailing state of the atmosphere in a specific place during a period of time, while Weather is for a period.
2. Standard atmospheric pressure equals the weight of a column of mercury with a length of cm.
3. Atmospheric pressure decreases with the increase of humidity because the density of is less than the density of
4. In polar regions, sun rays fall so the energy is distributed over a area.

Write the Scientific Term:

1. Description of the state of the atmosphere in a specific place during a short period of time.
2. The prevailing state of the atmosphere in a specific place during a long period of time.
3. A phenomenon occurring during the day where cold air moves from the sea to replace the hot air over the land.
4. A phenomenon occurring at night where cold air moves from the land to replace the warm air over the sea.
5. The weight of a column of air with a cross-sectional area of 1 m^2 and a length equal to the height of the atmosphere.
6. The actual mass of water vapor present in a specific volume of atmospheric air.
7. The percentage ratio between the actual mass of water vapor and the maximum mass the air can hold at the same temperature.
8. The difference between the maximum temperature and the minimum temperature in a single day.
9. The highest temperature recorded in a single day.
- 10.The climatic zone located between latitudes 66.5 and 90 North and South.
- 11.The atmospheric pressure at sea level, equivalent to 1013.25 millibars.

True or False (Correct the error):

1. Weather is the description of the state of the atmosphere for a long period of time that may reach years.
2. The closer we get to the poles, the temperature increases due to the perpendicularity of the sun.
3. The specific heat of water is higher than land, which causes the phenomena of land and sea breezes.
4. Cold air is denser than hot air
5. Atmospheric pressure increases the higher we rise above sea level.
6. Moist air has a higher atmospheric pressure than dry air
7. Land breeze occurs during the day when the land heats up faster than the water
8. The mercury barometer is used to measure temperature
9. The spacing of air molecules at high altitudes reduces its ability to retain heat
10. The relationship between temperature and atmospheric pressure is a direct relationship.
11. The daily average temperature is the result of subtracting the minimum temperature from the maximum
12. Low humidity in winter causes dryness of mucous membranes and increases influenza infection

Give Reasons For:

1. Decrease in temperature the higher we rise above sea level.

.....

2. Occurrence of sea breeze during the day.

.....

3. Moist air has lower atmospheric pressure than dry air.

.....

4. Temperature varies at the equator compared to the poles.

.....

5. Influenza spreads more widely in the winter season.

.....

6. Atmospheric pressure decreases as we go upwards.

.....

7. Coastal areas enjoy a milder weather than inland desert areas.

8. Decrease in air density when its temperature rises.

What happens if:

1. Sun rays fall very obliquely on the poles.

2. Hot air rises over the land during the day in coastal areas.

3. Increase in altitude above sea level regarding temperature.

4. Lighting a paper inside a bottle closed with an egg, then the flame goes out.

5. Increase in the percentage of air humidity (water vapor) in a certain area regarding atmospheric pressure.

6. Heating a specific area of the earth's surface regarding the air touching it.

Compare between:

1. Weather and Climate.

2. Sea Breeze and Land Breeze.

General Questions

1. If the maximum temperature in a city is 35°C and the minimum is 25°C . Calculate the daily average temperature and the thermal range.

1. If the atmospheric pressure in an area is 760 mm Hg. Calculate its value in millibars.

2. What are the factors affecting temperature?

3. Explain how humidity affects the health of the human respiratory system in winter.

.....

4. Explain the mechanism of the occurrence of "Land Breeze".

.....

5. What is the relationship between "air expansion" and its cooling when rising upwards?

.....

6. How does proximity to water bodies affect the daily thermal range?

.....

Ms. Doaa Yasser

2

Wind and Weather Forecasts

Wind

It is the horizontal movement of air on the Earth's surface, which arises due to the difference in atmospheric pressure from one region to another as a result of the uneven heating of the Earth's surface

Discuss this lecture

The concept of winds, the causes of their emergence, and their relationship to atmospheric pressure ranges and the Coriolis effect. It also explains atmospheric pressure systems, weather maps, and weather forecasting methods, and their importance in protecting humans and supporting various activities.

Atmospheric Pressure Zones

High Atmospheric Pressure (H):

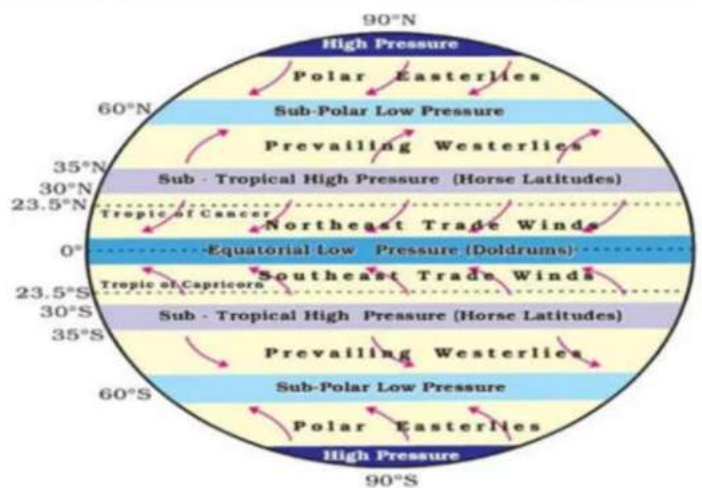
Forms in the polar regions as a result of the drop of both temperature and humidity percentage

Low Atmospheric Pressure (L):

Forms in the equatorial region as a result of the rise of both temperature and humidity percentage.

Atmospheric Pressure Zone	Approximate Location	The Cause	Symbol
Equatorial Low Pressure	Equator (0°)	Rise in temperature and humidity	L
High Pressure	Latitude 30°N and 30°S		H
Low Pressure	Latitude 60°N and 60°S		L
Polar High Pressure	Latitude 90°N and 90°S	Drop in temperature and humidity	H

- Air always moves from regions of High atmospheric pressure (H) to regions of Low atmospheric pressure (L).
- Wind movement and speed increase whenever the difference is large between atmospheric pressure values in adjacent regions.



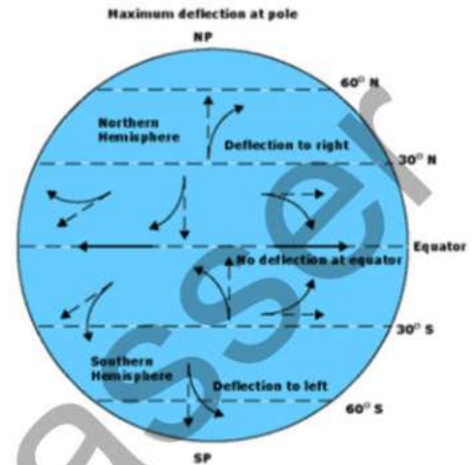
Major Pressure Belts and Wind System

Coriolis Effect

- This effect results from the Earth's rotation around its axis from west to east. As a result of this rotation, winds do not move in straight paths (except at the equator), but rather deflect into curved paths.

Deflection Rules

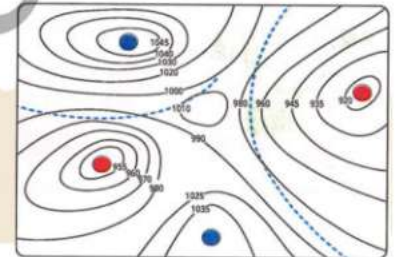
- Northern Hemisphere** : Winds deflect to the right of their original direction (with the direction of clockwise rotation).
- Southern Hemisphere** : Winds deflect to the left of their original direction (against the direction of clockwise rotation).
- And wind deflection** is maximum at the poles.



Weather Maps



- Weather maps illustrate the movement of air masses based on wind speed and atmospheric pressure systems.



Atmospheric Pressure Systems

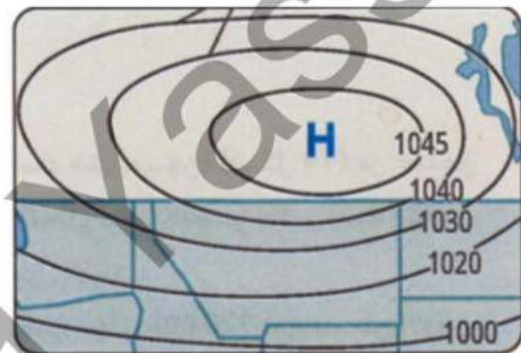
- Divided into atmospheric depressions (lows) and atmospheric highs.

Isobars:

They are points of equal atmospheric pressure at sea level, and are represented on weather maps by curved lines.

Aspect	Low-Pressure System (L)	High-Pressure System (H)
Definition	A region where the pressure at the center is lower than in the surrounding areas.	A region where the pressure at the center is higher than in the surrounding areas.
Symbol on Weather Maps	Represented by the letter L (usually red).	Represented by the letter H (usually blue).
Air Movement (Vertical)	Ascending air currents rise upward.	Descending air currents move downward.

Effect on Air	Rising air cools and condenses.	Descending air warms and dries.
Clouds and Rain	Leads to cloud formation and rainfall .	Leads to clear and sunny weather .
Horizontal Air Movement (Northern Hemisphere)	Air moves towards the center in a counter-clockwise direction.	Air moves away from the center in a clockwise direction.
Weather Condition	Unstable weather (cloudy, rainy).	Stable weather (clear, sunny).



Weather Bulletin Symbols:

The weather bulletin maps include icons (symbols) from which the state of the weather is inferred, and they are



Rainfall



Cloudy



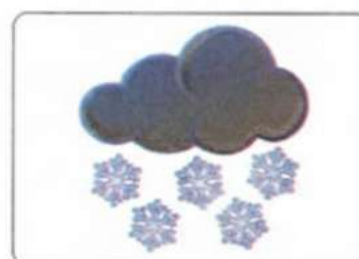
Sunny Weather



Tornadoes



Thunder and Lightning



Snowfall

Weather Forecasts

- It is the expectation of the future state of the atmosphere in a certain place. This is done by collecting, recording, and analyzing probable data about temperature, wind speed, atmospheric pressure, and storm paths using technologies, such as:

1. Meteorological Booth (Stevenson Screen) X

- Structure:** It is a box 65 cm long made of wood, painted in glossy white color to reflect sunlight instead of absorbing it.
- Ventilation:** The box contains slanted vents that allow air to enter and exit freely.
- Height and Location:** The box is installed on a stand that raises it about 120 centimeters (1.2 meters) above the ground. This height is important to protect the measuring instruments inside it from the heat radiated by the Earth. It is also placed in an open area, away from trees and buildings, because these obstacles can affect the measurements.
- Internal Instruments:** The booth contains a set of precise instruments to measure temperature, humidity, and atmospheric pressure.



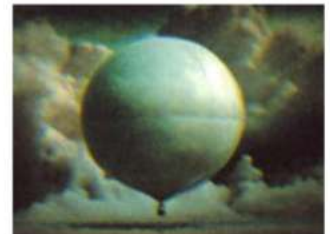
2. Weather Buoys: X

- Used in oceans, which collect data received from sensors to organize and process it, then send this data via satellites to monitoring centers around the world.



3. Radiosonde (Radio Probe) X

- Earth's surface data alone is not enough, as most weather phenomena form in the upper layers of the atmosphere. Here comes the role of the radiosonde.



- Structure:** It is a box carrying measuring instruments (temperature, pressure, humidity, and wind speed) carried by a large balloon filled with helium or hydrogen gas. These gases are lighter than air, which makes the balloon rise upwards.
- Timing:** It is launched twice daily from hundreds of stations around the world at two specifically determined global times (noon time and midnight).
- Process:** During the balloon's ascent, the instruments measure the surrounding conditions and continuously send data via radio waves to ground stations.
- The End:** The balloon continues to rise until it reaches a towering height (between 20 and 35 kilometers), where atmospheric pressure is very low. The pressure difference between inside the balloon and outside it leads to the balloon's expansion until it explodes. After that, the instrument box descends slowly to the ground using a small parachute. Mostly, it is not reused again due to the difficulty of retrieving it or its exposure to damage.



4. Satellites: X

Orbit around the Earth.



Q5. Weather Stations: X

- Distributed in every country of the world in different regions to collect weather data continuously and regularly.



Q: Are weather forecasts absolute facts?

A: No. Forecasts are "probable expectations" and not confirmed facts. The reason is that the atmosphere is affected by a large number of interacting variables. Therefore, the more we try to predict for a longer period of time in the future, the rate of uncertainty increases and small errors accumulate. For this reason, "forecasting for a coming week is less accurate than forecasting for two coming days."



Importance of Weather Forecasts

1. **Protecting Lives and Property:** When predicting dangerous weather phenomena such as hurricanes, floods, thunderstorms, or severe heat and cold waves, early warnings can be issued, allowing people to take necessary preventive measures such as evacuation or securing property.
2. **Supporting Economic Activities:** As in helping farmers determine times for planting, irrigation, harvesting crops, and pest control, which increases productivity and reduces losses.
3. **Aviation and Navigation Safety:** Accurate forecasts of winds and storms help in avoiding weather conditions that might threaten air navigation movement.



Preventive Awareness

- Following up on weather bulletins is observed to take appropriate precautions when weather fluctuations occur, such as wearing appropriate clothes, avoiding crowded places, and making the appropriate decision regarding traveling by land or sea.
- In the spring season of every year, Egypt witnesses weather fluctuations that can lead to the formation of storms loaded with sand and dust, known as Khamasin winds, which negatively affect the health of the respiratory system.

Lesson Two: Questions

Choose the correct answer:

1. Winds arise primarily as a result of the difference in from one region to another.
(a) Humidity percentage (b) Atmospheric Pressure (c) Earth's rotation (d) Terrain
2. The main factor responsible for the difference in atmospheric pressure on the Earth's surface is:
(a) Uneven heating (b) Wind speed (c) Earth's rotation (d) Vegetation cover
3. Low atmospheric pressure (L) forms in tropical regions due to:
(a) Low heat and humidity (b) High heat and low humidity
(c) High heat and humidity (d) Low heat and high humidity
4. At latitude 30° North and South, a pressure belt is formed that is
(a) Tropical Low (b) Neutral (c) Polar Low (d) High
5. The Coriolis effect leads to the deflection of winds their direction in the Northern Hemisphere.
(a) Right (b) Left (c) Opposite (d) Perpendicular to
6. The deflection of winds resulting from the Earth's rotation is at its maximum at
(a) The Equator (b) The Tropics (c) The Poles (d) The Oceans
7. Winds rotate around the center of a High Pressure (H) system in the Northern Hemisphere:
(a) Clockwise (b) Counter-clockwise (c) In straight lines (d) Towards the center
8. The weather in High Pressure (H) areas is characterized as being:
(a) Cloudy and rainy (b) Stormy and thundery (c) Clear and sunny (d) Very humid
9. The meteorological screen (Stevenson screen) is raised above the ground by:
(a) 65 cm (b) 2 meters (c) 120 cm (d) 35 km
10. The Radiosonde balloon bursts when reaching high altitudes due to:
(a) High temperature (b) Strong winds
(c) Colliding with clouds (d) Decrease in atmospheric pressure

11. The gas used to fill the Radiosonde balloon is:

- (a) Oxygen (b) Helium (c) Nitrogen (d) Carbon Dioxide

12. The accuracy of weather forecasts for a period of a week is its accuracy for a period of two days.

- (a) Higher than (b) Less than (c) Equal to (d) Double

13. The Radiosonde is used to transmit data via waves.

- (a) Sound (b) Light (c) Radio (d) Infrared

14. Weather data is collected from oceans using:

- (a) Stevenson screen (b) Radiosonde (c) Ground stations (d) Weather buoys

15. The direction of wind rotation around a Low Pressure system in the Northern Hemisphere is:

- (a) Clockwise (b) Counter-clockwise (c) Perpendicular (d) Away from the center

16. The Radiosonde is launched globally:

- (a) Every hour (b) Once daily (c) Twice daily (d) Weekly

17. The symbol for High Pressure on maps is:

- (a) L (b) H (c) M (d) P

Complete the following:

1. In the Northern Hemisphere, winds deflect the direction of clock movement, while in a Low Pressure system, winds rotate the clock.
2. Low Pressure is symbolized by the letter and usually in the color
3. The Radiosonde consists of a box carrying measuring instruments and a balloon filled with or gas.
4. The Stevenson screen is raised about meters above the ground to protect the devices from
5. The Radiosonde is launched at two specific times globally, which are and
6. In Low Pressure areas, air currents form, causing
7. Areas located at latitude 60° North and South are characterized by atmospheric pressure, while areas at latitude 30° are characterized by pressure.

Write the Scientific Term:

1. The horizontal movement of air on the Earth's surface as a result of atmospheric pressure difference.
2. The deflection of winds from their straight path as a result of the Earth's rotation around its axis.
3. Curved lines connecting points of equal pressure on weather maps.
4. An area where the pressure value at its center is lower than the surrounding areas.
5. An area where the pressure value at its center is higher than the surrounding areas.
6. A white wooden box with slanted slats used to protect meteorological instruments.
7. A device carried by a balloon to measure weather elements in the upper layers of the atmosphere.
8. Winds loaded with dust and sand that blow over Egypt in the spring season and harm the respiratory system.
9. Predicting the future state of the weather in a place based on data collection and analysis.
10. Floating devices used in oceans to collect weather data and send it via satellites.

True or False (Correct the error):

1. Winds move from low pressure areas to high pressure areas
2. Winds deflect to the left of their direction in the Southern Hemisphere
3. High Pressure is characterized by the presence of rising air currents and rainfall
4. Isobars are straight lines connecting points of equal pressure
5. The Stevenson screen is painted black to absorb heat
6. The Radiosonde balloon bursts at an altitude of 20-35 km due to the increase of atmospheric pressure inside it over the outside.
7. Weather forecasts help farmers in determining planting and irrigation schedules
8. The Stevenson screen is placed under trees for protection from rain

Give Reasons For:

1. Deflection of winds from their straight path on the Earth's surface.

.....

2. Painting the Stevenson screen in glossy white.

.....

3. Presence of slanted slats in the Stevenson screen.

4. Raising the Stevenson screen about 1.2 meters from the ground.

5. Explosion of the Radiosonde balloon when reaching high altitudes.

6. Formation of a low-pressure area at the equator.

7. Low pressure is usually accompanied by rainfall and clouds.

8. Weather forecasts for a week are less accurate than forecasting for two days.

9. High pressure is characterized by clear and dry weather.

What happens if:

1. There is a large difference in atmospheric pressure between two adjacent regions.

2. Ascent of air currents in the center of a Low Pressure system.

3. Arrival of the Radiosonde balloon to an altitude of 30 km.

4. Descent of air currents in a High Pressure area.

5. Placing the Stevenson screen adjacent to a building or a tree.

6. Occurrence of weather fluctuations and Khamasin winds in Egypt.

General Questions:

1. Explain the mechanism of the Radiosonde's operation from the moment of its launch until the return of the devices to Earth.

.....

2. What is the importance of weather forecasts for economic activities?

.....

3. What is the relationship between Humidity and Atmospheric Pressure?

.....

4. What role do "Weather Buoys" play?

.....

5. What are Khamasin winds and what is their effect?

.....

6. How is atmospheric pressure represented on weather maps?

.....

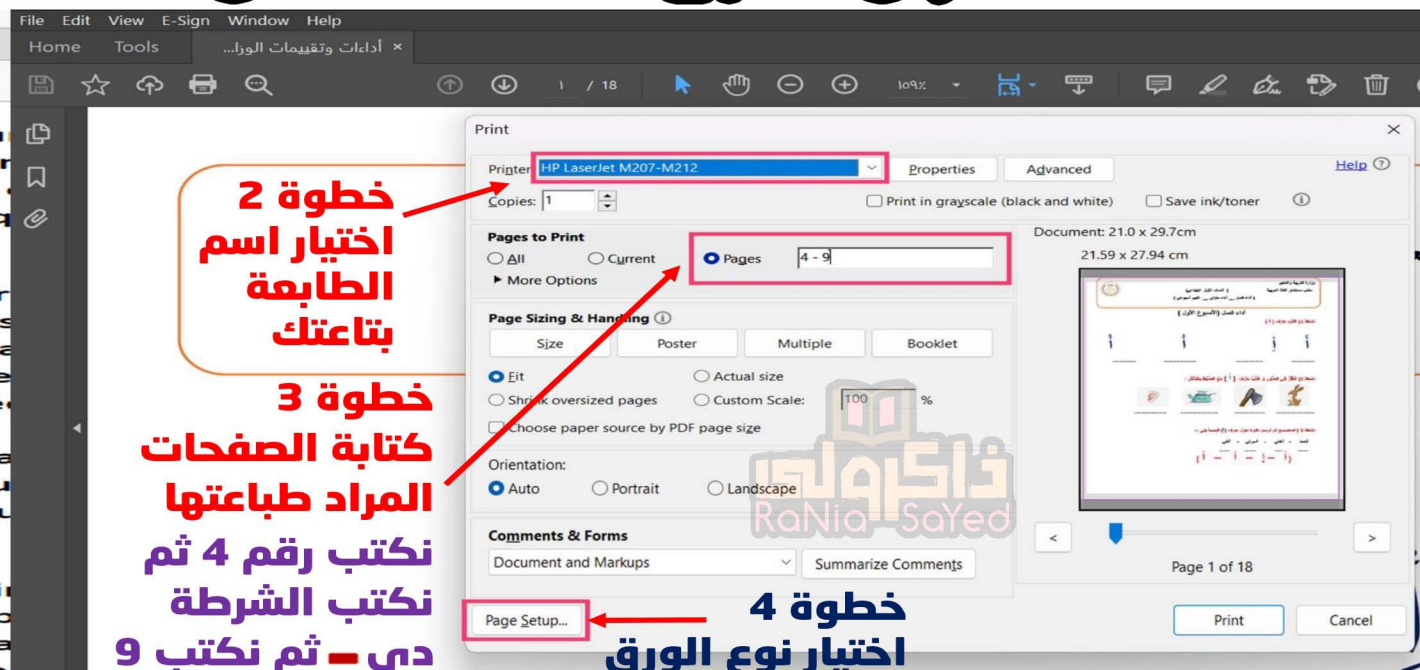
7. Mention three devices usually found inside the Radiosonde.

.....

كيفية طباعة صفحات معينة من ملف معين مثلا ازاي نطبع الصفحات من صفحة 4 الى صفحة 9



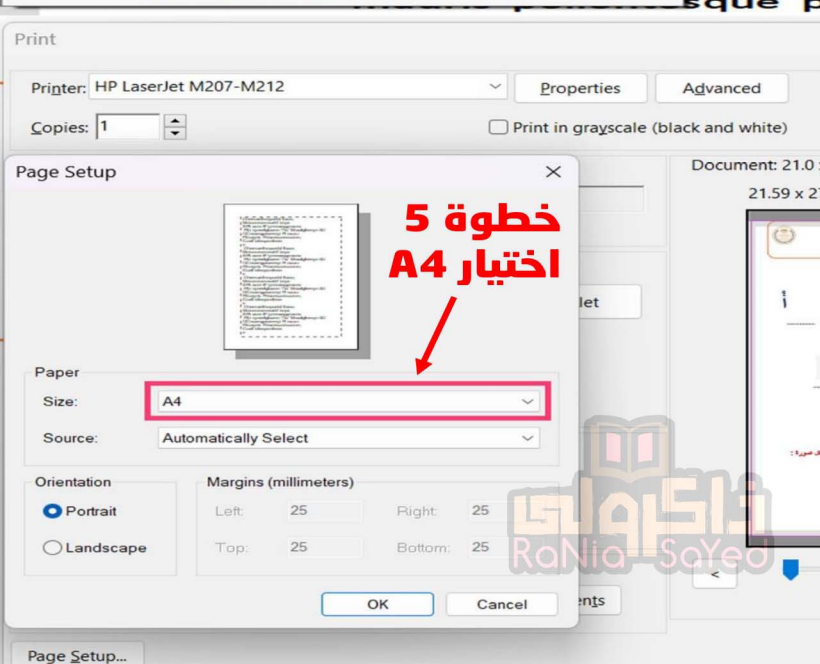
خطوة 1



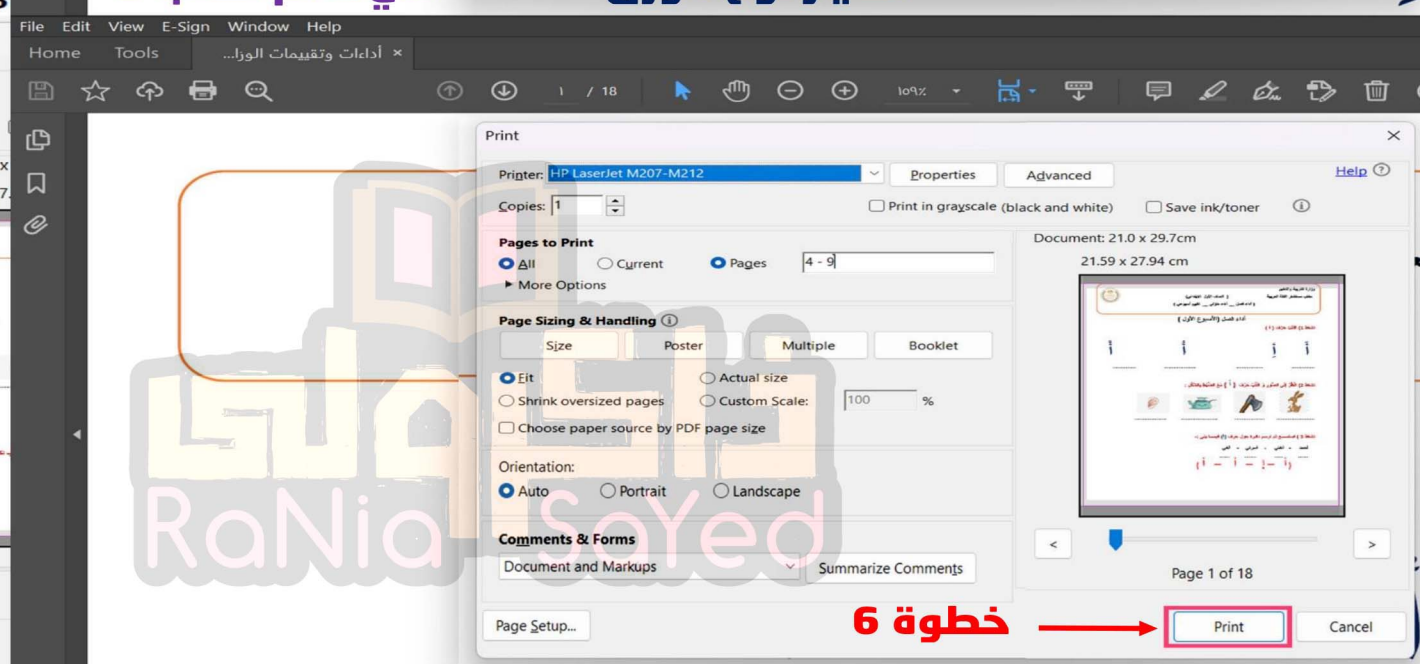
خطوة 2
اختيار اسم
الطابعة
بتاعتك

خطوة 3
كتابة الصفحات
المراد طباعتها
نكتب رقم 4 ثم
نكتب الشرطة
دي - ثم نكتب 9

خطوة 4
اختيار نوع الورق



خطوة 5
اختيار A4



خطوة 6